PAPER TRADE JOURNAL

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

"WE'VE STOPPED THE RUNAWAY!"

This manufacturer suffered from runaway lubrication. It would not "stay put." In his words, "Since we've been using Tide Water Green Cast Greases we've reduced the number of applications by 50%. There's also less grease used on the bearings of the mills where grease is pumped under pressure. Tide Water Grease resists the heat better. It maintains body to insure a good film to protect the bearing."

Operators in every branch of industry find that Tide Water's Green Cast Greases make light work of the tough jobs. They are compounded of the highest grade of paraffine base cylinder oil and a minimum of soap. More lubricating oil and less soap means more lubrication per pound of grease.

Look for the natural green cast . . . it identifies Tide Water's Green Cast Greases. Try them on your hardest jobs first and get the most convincing proof — the irrefutable evidence of better performance and economies of operation. We will gladly recommend the proper consistency for any application.

TIDE WATER ASSOCIATED OIL COMPANY
TIDE WATER DIVISION
17 Battery Place, New York, N. Y.

The Flying Yankee, Crack Train of the Boston and Maine and Maine Central Railroad, is one of many Diesel powered units lubricated with Tide Water Diesel Lubricants.

TIDE WATER INDUSTRIAL TYCOL Lubricants

THERE IS A COMPLETE LINE OF TYCOL LUBRICANTS SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE

SEPT. 2 1937

Vol. CV
No. 10

66th Year

DOWNINGTOWN

NEW
YANKEE FOURDRINIER
This machine incorporates the latest developments for quality and high production of facial tissue. Consult us if you have plans for a new machine or improvements to running machines for this grade, either cylinder or fourdrinier.
The Downingtown Manufacturing Co.,
Downingtown, Penna.
DESIGNERS AND BUILDERS OF MODERN PAPER AND BOARD MACHINES

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THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

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A LIFT TRUCK STORY ON PAPER
Besides handling paper rolls in horizontal position with flat plate scoop, Towmotor lift trucks also handle rolls on end, with the use of pallets. Furnished with forks, flat plate or any other type of pickup adaptors most suitable to the particular job. Dual tired driving wheels under the load for greater traction. Rear steering for short pivot turns on either driving wheel. High speed both forward and reverse. Maximum gas consumption ½ gallon per hour. Hydraulic lift and tilt. Load capacity up to 6000 lbs. Write for new Lift Truck Bulletin, with specifications and prices. Lowest cost per year as well as per ton moved, is the real cost.
TOWMOTOR
GAS HAULAGE EQUIPMENT SINCE 1919
TOWMOTOR CO. 1220 E. 152nd St. CLEVELAND, O.

IMPCO

FLAT SCREENS WITH Dunbar Drive

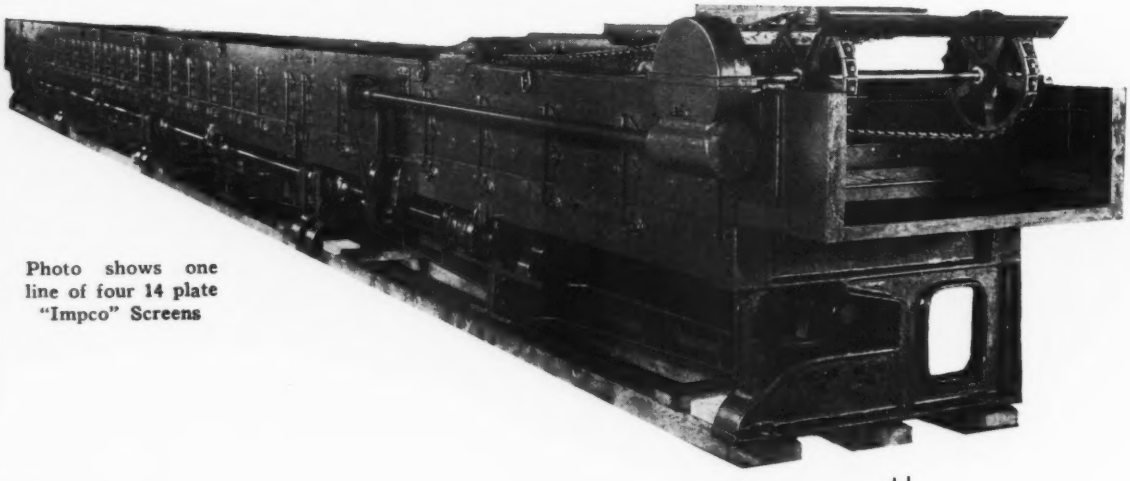


Photo shows one line of four 14 plate "Impco" Screens

Twenty Screens Recently Supplied Pacific Coast Mill!

Greater capacity and lower power requirements are definitely secured with the Dunbar Eccentric Drive. This compact Drive, in addition to being silent and free from vibration, has anti-friction bearings on drive shaft and anti-friction eccentric, removable bronze bush bearings on rocker shaft. Self aligning adjustable stroke eccentric, non-lubricated torsion bearings are added features of the Dunbar Drive.

Detailed information, engineering data and service are available to you without obligation. Write or wire.

IMPROVED PAPER MACHINERY CORPORATION

Nashua, New Hampshire

PAPER TRADE JOURNAL

Reg. U. S. Pat. Off.

SIXTY-SIXTH YEAR

Established Feb. 17, 1899
Consolidated Nov. 16, 1899
with Paper Trade Journal.

Vol. CV, No. 10 Thursday, September 2, 1937

Established Sept. 21, 1918
Consolidated Feb. 19, 1925
with Paper Trade Journal.

Hammermill Agents Hold Meeting at Erie

Paper Merchants Confer with Hammermill Officials in Two-day Business Meeting — Opening Address By President Behrend, Followed By Talks on New Developments, Advertising and Mill Activities — Sports

Erie, Pa., August 30, 1937—Marking the beginning of the second quarter century of relationships between the Hammermill Paper Company and its selling agents, one hundred and thirty-four paper merchants met with mill officials at Erie, Pa., August 26-27 for the twenty-sixth annual conference with Hammermill agents. All sections of the United States and foreign points as far away as India and Argentina were represented.

In the opening address E. R. Behrend, president of Hammermill, pointed out that honest, intelligent, and friendly opposition in these meetings has made the Hammermill Agents' group an important organization in the paper industry. Mr. Behrend presided during both days' meetings.

Norman W. Wilson, first vice-president and general manager of Hammermill followed Mr. Behrend's address, speaking on new developments at Hammermill and the economic outlook for the future. H. R. Baldwin, Hammermill's vice-president in charge of sales, conducted the detailed business of the meeting and presented charts showing sales trends of individual Hammermill lines.

The scope of Hammermill advertising activities was displayed by A. E. Frampton, advertising manager and assistant general sales manager. Bruce Barton, chairman of the board of Batten, Barton, Durstine and Osborn, Inc., Hammermill advertising counselors, spoke briefly.

Other men who addressed the group included D. S. Leslie, vice-president and assistant general manager of Hammermill, and J. F. Wuenschel, Pacific Coast sales manager, both of whom spoke about activities at Grays Harbor Pulp and Paper Company. G. W. Smart, G. P. Bothwell, and W. W. Woodbridge gave sales presentations of Hammermill papers.

Two-Day Business Program

The business program of the two-day session was planned and discussed by mill officials and the agents' advisory committee, meeting at Mr. Behrend's home on Wednesday, August 25. Committee members present were: Chairman W. N. Gillett, Chicago Paper Company, Chicago; Max Greenebaum, Beekman Paper and Card Company, Inc., New York; W. N. Schaefer, R. P. Andrews Paper Company, Washington; H. F. Petrequin, The Petrequin Paper Company, Cleveland; C. A. Esty, Carter, Rice & Co., Boston; I. W. Carpenter, Jr., Carpenter Paper Company, Omaha; H. T. Newell, Jackson Paper Company, Jackson; V. E. Hecht, Zellerbach Paper Company, San Francisco.

The agents elected the following new men to the advisory committee to replace members whose terms have expired: E. P. Magel, Crescent Paper Company, Indianapolis; N. K. Woodward, Midwestern Paper Company, Kansas City; and W. C. Strickland, Strickland Paper Company, Birmingham.

Newly elected members on the Advertising Committee are: P. W. Eason, Lathrop Paper Company, New York and C. M. Yates, Dudley Paper Company, Lansing.

Business meetings were held during the morning of each day at the Kahkwa Club. Both afternoons were given to golf and other games. The E. R. Behrend Golf Trophy was tied for by I. W. Carpenter, Jr., Omaha, and Arnold Russell, Hartford. Each man will hold the trophy for half the year.

Agent Prize Winners, Thursday, August 26, 1937

Golf—No. 1 Division: Low Gross, W. N. Stetson, Jr.; Low Net, Arnold Russell; Second Low Net, E. L. Walters; No. 2 Division: Low Gross, W. A. Rhodes; Low Net, Paul C. Potts; Second Low Net, W. J. Shaw.

Kicker's Handicap—Winner, E. R. Broderick.

Obstacle Golf—First Prize, B. E. Reeves; Second Prize, R. M. Clements.

Bowling—First Prize, John J. Dorsey; Second Prize, Donald Gardner.

The Selling Game—First Prize, H. F. Petrequin; Second Prize, W. J. Blake; Highest Score (single inning), M. Reinhold.

Darts—First Prize, D. Payne; Second Prize, Charles Schuman.

Winners of Final Events

Golf—First Low Net, D. Zahnizer; Second Low Net, H. Baldwin; Kickers—first, J. Devitt; second, Dr. Croup; third Stanley Byron.

Bowling—A. Carmosino.

(Continued on page 24)

Kimberly-Clark Recognizes New Union

Employees Independent Union Replaces Former Mill Council—Wisconsin Pioneer in Unemployment Insurance — One-day Strikes Collapses — Trust Fund Balance of Late George A. Whiting Over 3 Million Dollars.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., August 30, 1937—Kimberly-Clark Corporation, Neenah, Wis., has entered into an agreement with the newly organized Employees Independent Union for a closed shop, according to an announcement made last week. The agreement was reached at a conference between the governing committee of the union and corporation officials.

Action on the matter of wages and hours is contemplated later, but no radical changes from the present schedules are anticipated.

The union was recently recognized by the company as the sole bargaining agent, in conformity with new federal and state labor laws, and takes the place of the former mill council. The arrangement applies to 2,532 workers out of 3,550 in the mills at Neenah, Kimberly, Appleton and Niagara, Wis., and Niagara Falls, N. Y.

Non-union members employed in the Lakeview and Badger-Globe mills at Neenah, have been considering organizing a rival union affiliated with the American Federation of Labor. A meeting was held last week of these workers, at which Ray Richards, Wisconsin Rapids, Wis., an officer of the Wisconsin Federation of Labor, was the speaker.

Officers have been elected by the Employees Independent Union, and are as follows: Harold Firdl, Kimberly, Wis., president; Mitchell Johnson, Neenah, Wis., vice-president; Amos Green, Niagara, Wis., secretary, and George Ritten, Appleton, Wis., treasurer.

Pays $1,080,000 Unemployment Insurance

Wisconsin, pioneering in unemployment insurance, has paid $1,080,000 to 52,000 workers since August 17, 1936, when the first check was issued under the state law. Contributions have been made by state concerns for three years, and benefits have been paid for one year. The net balance in the state's unemployment reserve funds now exceeds $25,000,000. Paper mills have been operating steadily, with production increasing, and have made very few withdrawals from the reserves earmarked for their benefit payments ranging from $5 to $15 a week to those who are laid off. Out of 4,300 employers' accounts now on record, 2,600 have paid benefits to date. About 1,700 employers, or 40 per cent, have given their employees sufficiently steady work so they have had no benefits to pay.

Establishes Own Water Utility

The village of Combined Locks, Wis., which has been dependent largely on the Combined Locks Paper Company for its water supply for fire protection, has been granted permission by the Wisconsin Public Service Commission to establish a water utility of its own. The water supply will be obtained from mains piped from the neighboring village of Kimberly, Wis., the mill village of the Kimberly-Clark Corporation. A schedule of household rates has been set up, and 25 residential owners have applied for connections to date.

One-Day Strike Collapes

A one-day strike at the Moloch Foundry and Machine Company, Kaukauna, Wis., was ended when seventy-five employees were given recognition of their union, a closed shop, and a 1-cent hourly increase in pay. A four-hour session with union representatives and the management after the plant had been closed down brought a settlement, and work was resumed. The agreement is in effect for ninety days, at which time another conference will be held.

Farmers' Utilizing Paper Sludge

Farmers are being supplied with large quantities of sludge by the paper mills at Stevens Point, Wis. A WPA lime loading project is making it possible for them to obtain the material without cost to them, under soil building allowances. Federal payments of 50 cents per cubic yard are allowed. The lime is drier than usual, and easier to handle.

Whiting Trust Fund Has $3,240,713

According to the records of the Winnebago county probate court at Oshkosh, Wis., a trust fund set up by George A. Whiting, late president of the George A. Whiting Paper Company, has a balance of $3,240,713.40. E. A. Oberweiser, president of the Whiting-Plover Paper Company, Frank B. Whiting, president of the George A. Whiting Paper Company, and Attorney George Hilton are trustees of the estate. Frank B. Whiting and his children are the chief benficiaries of the trust fund.

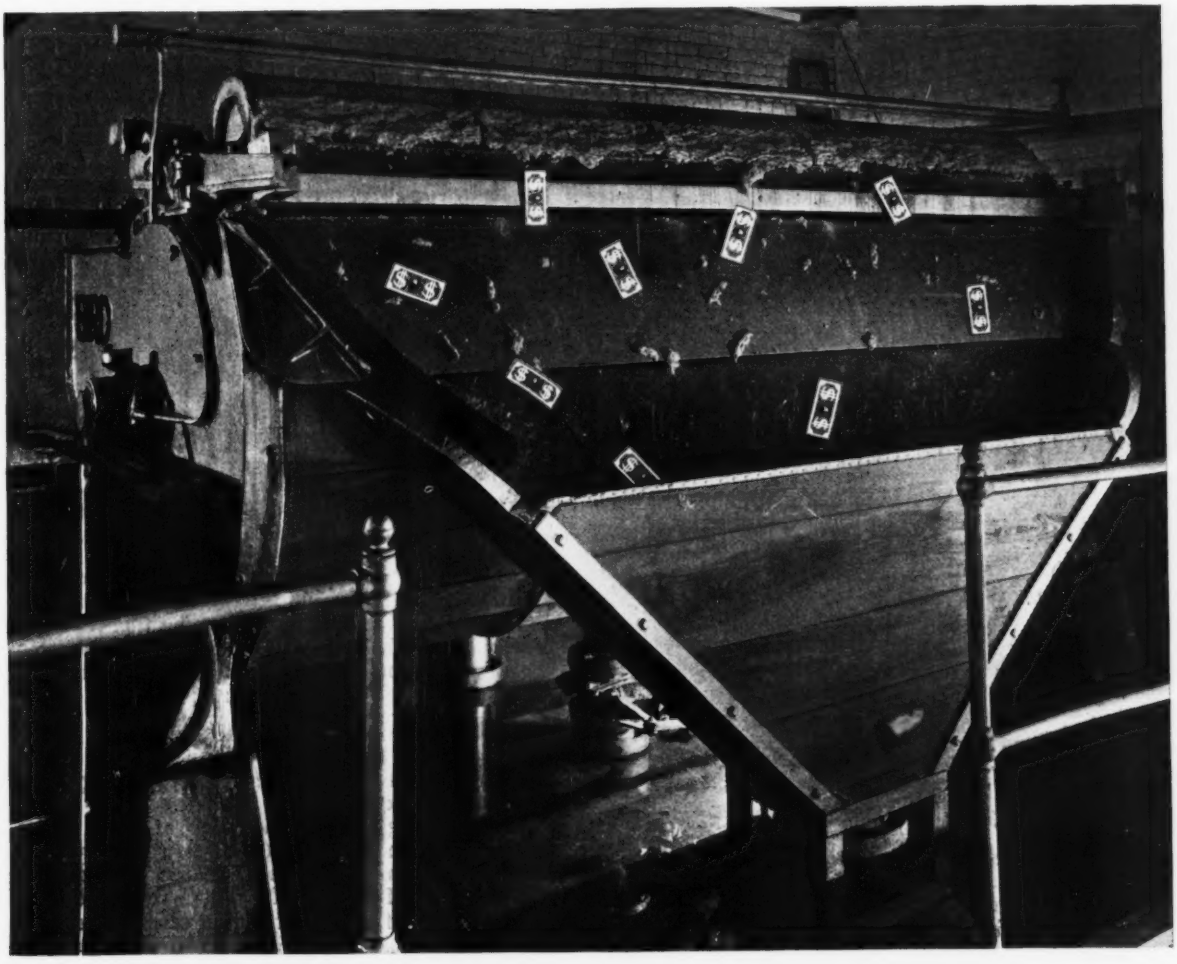
Bertram-Nemocheck Nuptials

Robert Bertram of Appleton, Wis., who is associated with the sales department of the Menasha Products division of the Marathon Paper Mills Company, Menasha, Wis., and Miss Nona Nemacheck of Appleton, were married Saturday morning, August 28, at St. Mary's Catholic church at Appleton. They will reside at 533 N. Durkee street, Appleton, upon their return from a honeymoon trip.

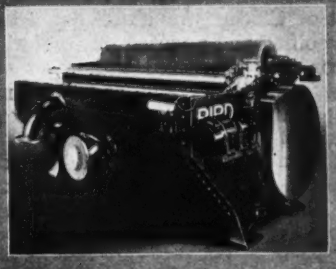
International Sulphur Co. Starts Testing

Exploration work on sulphur deposits is being conducted on properties in California, Mexico and Central America by International Sulphur Company, according to Alpheus L. Hanscome, vice-president, Sharon Building, San Francisco. The company proposes to mine sulphur under its six Basic United States Patents, and to sell in large quantities in foreign countries. Officers, aside from Mr. Hanscome, are William D. Patterson, Newark, Cal., president; Randolph R. Nickerson, Sharon Building, San Francisco, secretary; Charles S. Haley, chief engineer; Harold L. Hazen, president and general manager of Caliente Cyaniding Company, Delamar, Nevada, consulting metallurgist.

HOW CAN YOU LOSE?



BIRD MACHINE CO.
SOUTH WALPOLE
MASSACHUSETTS



Putting in a Bird Save-All is like betting on a sure thing. It's one piece of equipment that pays for itself right from the start. You don't have to trust to luck. The net return can easily be figured in advance of a single penny of investment.

Say the word and we'll come down and work it out with you.

BIRD SAVE-ALL

YOU CAN MAKE MORE MONEY WITH NEW BIRD MACHINERY

Higher Prices May Await Greater Demand

Any Advances at Present Not Merited By Current Volume—Record Attendance Expected at N. P. T. A. Meeting — Salesmen's Association Simplifies Trade Customs — Coarse Paper Merchants Outing—Other News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., August 30, 1937 — The Chicago paper markets continues dull and featureless with discussion confined to the new production soon to enter the field, the fine paper meetings in New York City during the week and the time when price advances can be expected. At the present time, according to local reports, volume does not merit material price advances. The industry will simply have to see if demand will resume at the late Spring point when mills were faced with the impossibility of keeping pace with orders. Any advances at present would be considered unwise in the face of the general quietness in demand, say local paper executives.

Kraft Market Continues Buoyant

The kraft market continues perhaps as buoyant as any market here with much conjecture over the effect of board production in the new Southern mills. Groundwoods are firm with the better feeling in the newsprint market contributing to this betterment. The fine paper grades generally showed no disposition to change during the week. Sulphites were firm. All grades of books and covers showed a firm undertone. The board market was unchanged. In the waste paper market there was more specific activity with a world-wide shortage being discussed. The strengthening process in all grades promised to continue next week with prices up on several grades and mills showing a renewed interests in waste papers.

N.P.T.A. Fall Meeting Notes

Advance reports indicate that the fall meeting of the National Paper Trade Asociation, to be held in Chicago September 19 to 23, will attract a record attendance with the supervised exhibits doing their share to invite newcomers to the business sessions. The exhibits are to be concentrated on the fifth and sixth floors and will be easily available for buyers. The most productive methods of preparing exhibits have been adopted and advance booking of exhibit space as well as hotel reservations point to one of the finest and most wellrounded meetings in many years. The midwest division of the Salesmen's Association of the Paper Industry has announced that its windup tournament, held in conjunction with the N.P.T.A. meetings, has been definitely set for September 23 with the Olympia Fields course as the scene for the outing. Ralph Burnet, golf chairman, divulged the full details of the program to the August 16 noon luncheon of the salesmen and even the least enthusiastic golfers expect close to 200 members and guests in attendance. The semi-final golf outing of the salesmen's organization were held Friday, August 27, at the Park Ridge Country Club.

Simplifies Trade Customs

Some indication of the importance and scope of the Salesmen's Association of the Paper Industry as a factor in the paper industry is evidenced in the recently revised publication of the personnel of the midwest division which shows the addition of fifty new members secured under the leadership of G. K. Gibson, chairman of the membership committee. The individual membership has reached the 265 point while 124 mills are represented in the official directory. The directory has a somewhat new departure in the inclusion of a brief discussion of the SAPI program of work. Revision of the trade customs of the industry in which the Association took an important part is credited with being a most "important piece of work" with the added statement that "custom differentials, being a part of the price for all paper transactions, need revision and harmonizing between the various Associations. The Salesmen's Association has, with the aid of the American Paper and Pulp Association, undertaken the job of revision". One of the first steps described is the compilation of consolidated trade customs which have been submitted to various members of the APPA with specific recommendations. The Salesmen's Association feels that if the recommendations are carried out they will result in a simplification mutually beneficial to both buyer and seller. The Association is definitely interested in building simplification practices into the price structure problem.

Wages Down in July

A sharp decline in earnings featured the report of the seventh federal reserve district, covering paper and printing figures for the week of July 15, as compared to June 15. The 616 firms reporting from the five states showed a total of 79,568 wage earners with earnings of $2,250,000. There was no change in the number of wage earners but earnings declined 4 per cent during the period. This compares with a 1.8 per cent increase in wage earners and a 1.6 decline in earnings for the total non-durable goods groups. The States of Wisconsin, Iowa, Michigan, Illinois and Indiana are in the seventh federal reserve district.

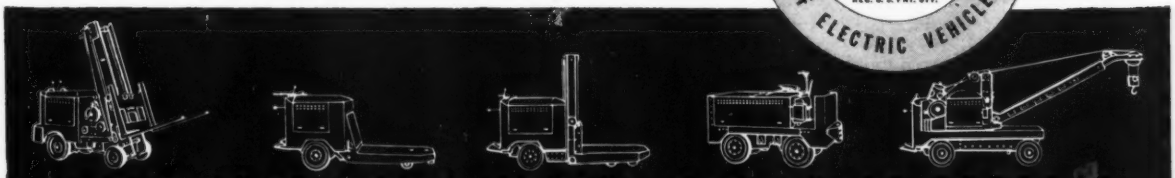
Paper Merchants on Outing

Coarse paper merchants in Chicago and vicinity are planning a resumption of their enjoyable Fall outings on September 9. On that date members of the Chicago Paper Association will assemble at the Medinah Country Club west of Chicago for an all day affair which will provide golfing and a varied line of entertainment. Luncheon will be served with a special dinner event arranged for the evening at which time the prizes will be awarded. S. S. Weil has been appointed chairman of the special committee in charge of the arrangements with H. W. Borchardt, W. E. Beier, M. A. McNulty, Walter Shulman and W. J. Shapland making up the special group. According to advance information, the Chicago Paper Association also plans to round up a number of old members and old-timers for the one day outing.

UP IN THE AIR?

ARE HANDLING costs in your plant "up in the air"? The down-to-earth suggestions of the Baker Materials Handling Engineer will help you bring stubborn cost figures into line. His authentic, detailed reports on performance and costs, covering thousands of handling problems will prove helpful to you. You can determine the value of Baker Equipment in your own plant. And the Baker reputation as builders of long-lived equipment guarantees you many years of substantial savings . . . Get the facts on Bakers for your own handling problems. Write the INDUSTRIAL TRUCK DIVISION *of the Baker-Raulang Company,* 2162 W. 25th St., Cleveland, O.

OLDEST MANUFACTURER
Baker
TRADE-MARK REG. U. S. PAT. OFF.
OF ELECTRIC VEHICLES



POWER INDUSTRIAL TRUCKS FOR EVERY PURPOSE

Financial News of Pulp and Paper Industry

F. P. Carpenter Approves Brown Co. Reorganization Plan — Union Bag To Ask Capital Increase As Special Meeting, Sept. 14 — Sutherland Paper Declares Extra of 20 Cents Per Share — Other Financial News.

New York Stock Exchange

High, Low and Last for the Week Ending September 1, 1937

	High	Low	Last
Armstrong Cork Co.	62¼	58¼	58½
A. P. W.	7	6¾	6¾
Celotex Corp.	40	37	38½
Celotex Corp., pf.	76	75½	76
Certain-Teed Products Corp.	13	12⅛	12⅛
Certain-Teed Products Corp., pf.	51½	50	50
Champion Paper & Fibre Co.	54	50¾	51¾
Champion Paper & Fibre Co., pf.	110	109	109¾
Congoleum-Nairn Co.	37½	36⅝	37¼
Container Corp. of Amer.	28⅜	26¼	27
Continental-Diamond Fibre Co.	15⅜	13⅞	13⅞
Crown Zellerbach Co.	22	20⅛	20¼
Crown Zellerbach Co., cum. pf.	99⅝	98	98
Flintkote Co.	29	25⅝	25⅝
Robert Gair	13⅜	12¼	12¼
Robert Gair, pf.	33½	33	33
International Paper & Power (a)	18¾	17½	17½
International Paper & Power (b)	13¾	12¾	12¾
International Paper & Power (c)	7¼	6⅝	6¾
International Paper & Power, pf.	105½	99½	99½
Johns Manville Corp.	130	125	125
Kimberly-Clark Corp.	39¼	39⅛	39⅛
MacAndrews & Forbes	31½	31½	31½
Masonite Corp.	52	50½	50¾
Mead Corp.	26½	25	25
Mead Corp., pf.	90	90	90
Paraffine Companies, Inc., pf.	69⅛	67½	67½
Ruberoid Co.	34	31⅞	32¼
Scott Paper Co.	42	40¼	41¾
Sutherland Paper Co.	30¼	30	30
Union Bag & Paper Corp.	77⅞	75	76
United Paperboard Co.	10½	8½	9
U. S. Gypsum Co.	110	108	108

New York Curb Exchange

High, Low and Last for the Week Ending September 1, 1937

	High	Low	Last
American Box Board Co.	19⅛	18	18
Brown Co., pf.	79½	75½	75¾
Great Northern Paper Co.	39	39	39
St. Lawrence	12½	12½	12½
St. Regis Paper Co.	18¼	7½	7¾
St. Regis Paper Co., pf.	108	108	108
Taggart Corp.	9⅞	9¼	9¼

F. P. Carpenter Backs Brown Plan

MANCHESTER, N. H., August 30, 1937.—Frank P. Carpenter, industrialist and financier, announced last week that he approved the reorganization plan of the Brown Company and had furnished his assent to H. L. Brown, president.

The Carpenter family holds 6200 shares of preferred stock.

"I have been an investor in Brown Company for more than 40 years," Mr. Carpenter says, "and am convinced as a stockholder and a paper manufacturer that a great future lies before the company in the development of its alpha cellulose pulp on which it controls many exclusive patents.

"This pulp is used largely by the rayon, paper, plastic and other allied industries and possesses unlimited possibilities. The opportunity afforded the company to secure $12,500,000 in new working capital for the expansion of this end of the business is one which every preferred stockholder should welcome."

Declaring that Brown Company's prosperity was essential to all New England, he said, "Brown Company has been a pillar of New England industry for 85 years and I understand through its extensive research has opened an entirely new vista for a varied number of New England industries using pulp and paper. The company is a large taxpayer in several New England states, a large purchaser of raw materials and a large shipper. The city of Berlin itself owes its very existence to Brown Company. I heartily recommend approval of the reorganization plan not only because of my faith in the Brown family but because I believe it is eminently fair to all classes of security holders and I have yet to hear of any better plan."

Union Bag to Ask a Capital Increase

Alexander Calder, president of Union Bag and Paper Corporation, has sent out notices to all stockholders of the corporation of a special meeting of them to be held September 14. The meeting will be at the corporation office, room 717, No. 1 Exchange Place, Jersey City, N. J.

At this time three proposals will be presented stockholders for action as follows:

To take action upon a proposed amendment to the Agreement of Consolidation under which this corporation was formed by which each share of the issued and outstanding capital stock of the corporation will be changed into four shares of such capital stock, such change to be effective at the close of business on the date of the stockholders' meeting.

To take action upon a proposal to amend the Agreement of Consolidation to provide for the increase of the authorized capital stock of the corporation to 1,500,000 shares.

To take action upon a proposal to authorize the issuance of $10,000,000 principal amount of debentures of the corporation, all or any of which may be convertible into the capital stock of the corporation.

To take action upon such other business as may properly come before the meeting.

Mr. Calder states that the directors of the company believe the steps proposed at this time will bring about a sound financial consolidation of the gains resulting from the expansion of the corporation's manufacturing facilities, which commenced with the construction of the Savannah plant in 1935.

Urges Delay on Brown Plan

Pointing out that the debtor company's method of solicitation of acceptances to its plan of reorganization has not been submitted to or approved by the court, the Brown Company bondholders protective committee of which Charles Francis Adams is chairman, in a letter to bondholders states that "this committee is convinced that the present solicitation of acceptances is definitely premature and not in the interests of the bondholders—whether regarded as final and binding or as merely preliminary in character.

"Attention is called in this connection to the provisions of article X of the debtor company's plan, which reads as follows: 'The acceptance of the plan on the part of the holders of old bonds, general claims, old preferred stock and old common stock

may be evidenced in such manner as the court may determine.' In view of these express provisions of the plan, it is pertinent to note that the present method of solicitation has not been submitted to, or approved by, the court."

The letter also calls particular attention to the security afforded by the Canadian subsidiary. It states: "At present all of the stock and all of the first mortgage bonds (aggregating $3,821,000) of the Canadian subsidiary are pledged to secure the bonds which you hold. In addition, the mortgage of the Brown Company contains covenants which, in effect, require the Brown Company to pledge as additional security all further funded debt and stock of the Canadian subsidiary."

Sutherland Paper Declares Extra

An item reflecting the improvement in the paper business appears in the financial circles this week stating that the Sutherland Paper Company has declared an extra dividend of 20 cents a share in addition to the regular quarterly of 40 cents a share on the common stock, both payable September 30 to shareholders of record September 20. A similar extra was declared a year ago and reports to stockholders continue to indicate an improvement in Sutherland business.

Koepke Co. Increase Stock

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., August 23, 1937—Capital stock of the Koepke Construction Company, has been increased from 500 to 1,000 shares of common stock at no par value, according to an amendment to its articles of incorporation filed with the Secretary of State. L. H. Koepke is president of the corporation and G. A. Koepke is the secretary. The company is building some of the additions to the Kimberly-Clark Corporation mills, and recently took over the corporation's machinery erection operations.

Sutherland To Offer Stock

The Sutherland Paper Company is planning to offer 28,700 shares of authorized and unissued stock to present to common stockholders at $22 a share, to provide a gross sum of $631,400. The date of the offering and details of the financing will be announced later. There are 287,000 common shares outstanding.

Detroit Paper Products Pay 6 Per Cent

The Detroit Paper Products Corporation has voted an initial distribution at the rate of 6 per cent per annum on the 6 per cent cumulative convertible preferred stock, payable October 1. This disbursement has accrued from the date of issue, July 19, to September 30.

Argentina Imports More Newsprint

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 25, 1937—Newsprint paper imports into Argentina in June were greater than in the preceding month but below the number of units imported in June 1936. Out of 21,404 units received in June, Finland, the largest single supplier shipped a total of 11,203 units consisting of 11,003 bobbins and 200 bales.

Price Bros. Report Smaller Loss

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., August 30, 1937—The financial statement of Price Brothers and Company, the first to be issued since the company was reorganized, shows the anticipated wide expansion in operating earnings, which stand at $1,789,316 as compared with $675,324 in the preceding year and $681,952 in the fiscal period ended March 31, 1935. After all deductions, including bank and bond interest, depreciation, depletion etc., there is a net loss on the period of $293,913, as compared with a net loss in the preceding year of $1,595,625.

In presenting the report to shareholders, President C. H. L. Jones states that the company's mills are operating at capacity, but prices are still low and operating costs have increased. The outlook for increased prices in the future appears bright, he adds.

In conjunction with the issuance of the financial statement is called a special meeting of shareholders, to be held in Quebec on Tuesday, September 14, for the purpose of considering and approving amendments to existing by-laws, made necessary by changes in the organization since the emergence of the company from bankruptcy. Shareholders will also be asked to sanction an amendment changing the company's financial year to March 31. This will give the company a full year's operation after bankruptcy.

Fixes Rates on Pulp from Savannah

FORT EDWARD, N. Y., August 30, 1937—The Interstate Commerce Commission has authorized a rate of not lower than 40 cents per 100 pounds for transportation of wood pulp from Savannah, Ga., to Hudson Falls and higher rates between intermediate points following investigation. The announcement was made at a temporary arrangement pending action on an application filed by J. G. Kerr, agent for carriers, who asked relief from the long and short haul provision of the Interstate Commerce act. It is provided, however, that rates from, to and between higher-rated intermediate points shall not be increased except as may hereafter be authorized by the Commission, or exceed the lowest combination of rates subject to Interstate Commerce Act. Provision is also made that the relief granted herein shall not apply where the distance over the longer line or route is more than 33 per cent greater than the distance over the short all rail line or route from and to the same points.

L. L. Brown Issues New Sample Book

In an appropriate cover color combination of brown and grey, a new sample book of L. L. Brown's Greylock Linen Ledger has just been issued. It is 8½ x 5½ in size and shows substantial additions to the list of items in which this well-known 85 per cent white rag record paper is stocked. Copies may be had from the L. L. Brown Paper Company, Adams, Mass., or from its distributors.

Pictorial Paper Package To Pay Extra

The Pictorial Paper Package Corporation has declared an extra dividend of 3¾ cents a share on the common stock in addition to the usual quarterly disbursement of 8¾ cents a share, both payable September 30.

Production and Distribution of Paper

Department of Commerce Publishes Important Study of Paper and Pulp Industry Covering Output of 730 Mills—Data of Production with Cost of Materials Tabulated — Regional Distribution Is Graphically Shown.

For the purpose of giving industrial marketing executives a basic picture of the size and location of the market represented by the paper and pulp industry, the United States Department of Commerce has recently published "Basic Industrial Markets—Pulp and Paper Industry."

The report contains 77 pages of text. The twelve tables showing the location and production capacity of the paper and pulp industry were compiled from figures taken from Lockwood's Directory of the Paper and Allied Industries. The tables are accompanied with explanatory texts. The Department of Census has supplied data for a summary of the industry, listing by states the number of employees, wages paid, cost of materials and the value of products. Distribution of the output of all paper mills and their products is graphically shown in twelve maps. The price of the paper bound report is ten cents.

Importance and Size of the Industry

The study states: "The importance of the industry as an outlet for industrial equipment—paper machines, beaters, turbines, building material, tanks, vats, valves, piping, motors, and pumps, as well as a vast array of supplies of almost a thousand sorts—cannot be underrated.

"Both the pulp and paper divisions of the industry are noted for their insistence upon quality in the purchase of material. They are also notably scientific buyers. Consequently the achieving of sales success on an economical basis demands the establishing of adequate sales and service contacts where the utmost attention may be given to the customer at minimum cost."

According to the study, the paper and pulp industry is one of the most important manufacturing groups in this country. The normal value of the domestic output of paper and pulp in 1933 was valued at $695,655,000, of which paper represented $560,963,000 and pulp $134,692,000. This was manufactured in 730 mills having a total capacity of 17,072,200 tons. When the industry was operating on a curtailed basis in 1933 in many sections of the country, it continued to give employment to 118,000 people.

Paper Industry Still Growing

Paper was first produced in China centuries ago and the first paper mill in this country was operated near Philadelphia in 1690, making a hand product. The invention of the Fourdrinier paper making machine in the 19th century marked the beginning of the rapid growth of the industry. The industry is still expanding. More uses and a wider demand for paper and paper products are evident daily. The recent success in making paper from southern slash pine seems to indicate that the eastern section of the South will probably see a considerable development of the industry within a few years.

Paper is now produced in 35 states, six of which manufacture 55 per cent of the total. The leading states are Maine, New York, Pennsylvania, Ohio, Michigan and Wisconsin. Maine, New York and Washington, manufacture 69 per cent of the national production of newsprint. Virginia, Alabama, Louisiana and Arkansas produce 68 per cent of the bag and wrapping paper. The great manufacturing centers for book and writing papers are in Massachusetts, New York, Ohio and Michigan. More than 70 per cent of this part of the industry may be reached overnight from New York City.

In the production of tissue and crepe paper, Wisconsin produces 28 per cent of the national capacity, while New York manufactures slightly over 27 per cent.

The newsprint division of the industry has a capacity of over six million pounds per day. Maine is the leading state with 39 per cent, New York second with 17 per cent and the state of Washington third with 13 per cent. Only one county in this country has a daily production of more than one million pounds. This is Penobscot County, Maine, whose production of 1,890,000 pounds is more than half of the leading state's total capacity.

Wrapping, Bag, and Paper Board

The South has become an important factor in the production of wrapping and bag paper. Virginia, Alabama, Louisiana and Arkansas are the leading centers, though some paper of this kind is made in 18 different states. In county production, Ouachita Parish in Louisiana is the only county in this country with a daily production of one million pounds. Expansion of production continues in the south-western tier of states.

Paper board is manufactured in 27 states and is more widely distributed than other kinds of paper products. Michigan, Illinois, New Jersey, New York, Ohio and Indiana represent 67 per cent of the national capacity. Monroe County, Michigan, with a daily capacity of 2,770,000 pounds, is the leading center, while Cook County, Illinois, is second with a daily capacity of one million pounds.

Miscellaneous and specialty papers are produced in 28 states and the District of Columbia. New York, Maine, Ohio, Pennsylvania, Wisconsin and Virginia produce 56 per cent of the national capacity, while Massachusetts, Connecticut, New Jersey, Indiana and Michigan are also major producers of this stock. The leading counties are Philadelphia, Pennsylvania; Hamilton, Ohio; and Clakamas, Oregon, each of which has a daily production capacity of over one million pounds.

Production of Pulp

While the pulp industry must be considered directly in connection with paper manufacturing, it differs in many ways. Pulp forms the basis of paper and is also used in vast quantities for the manufacture of other materials, such as wall board, insulators, restaurant trays and hundreds of cellulose products, from cellophane to imitation leather. The pulp indus-

try is widely spread, some pulp being manufactured in 27 states, of which Washington, Wisconsin, Maine, Louisiana, New York and New Hampshire, produce about 60 per cent of the national capacity. Washington, Wisconsin and Maine each have more than 10 per cent of the total domestic production, the three combined producing 40 per cent of the total. The counties of Penobscot, Maine; Coos, New Hampshire; Ouachita, Louisiana and Clark, Washington, each have a daily capacity of more than one million pounds.

Sulphite, Sulphate and Soda Pulp

Maine, New Hampshire and New York combined have 36 per cent of the country's 15,887,000 pounds daily capacity of sulphite pulp. Washington and Oregon combined are second with 29 per cent. The combined output of Wisconsin and Michigan is 22 per cent. Coos County, New Hampshire is the only county with a daily production of more than one million pounds of sulphite.

Sulphate pulp is the base stock for the manufacture of kraft and similar papers and the mills producing this type of stock are differently distributed. The South and South West are leading regions, though some sulphate pulp is produced in 15 states. Louisiana produces 26.8 per cent of the national capacity, Washington 12 per cent and Virginia 11.6 per cent. These three states have a combined production of about half of the total national production of 10,505,000 pounds daily. Ouachita Parish, Louisiana has a daily production of one million pounds and Bay County, Florida about 850,000 pounds.

Soda pulp is produced in 18 states, with Pennsylvania, Maine, Mississippi and New York the leading centers, having a combined production of 53 per cent of the national output.

Mechanical Pulp or Ground Wood

The 17 states producing mechanical pulp are widely scattered, with the bulk concentrated in three regions. In the North East, Maine, Massachusetts, Vermont, New Hampshire and New York, have 59 per cent of the total national capacity. In the Middle West, Wisconsin, Minnesota and Michigan have 23 per cent. In the North West, Washington and Oregon have 16 per cent. The balance of production of slightly more than 2 per cent, is distributed through the other seven producing states.

Indianapolis Looks for Active Fall

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., August 20, 1937.—After a summer of rather dull business, the paper trade is looking forward to a good fall. Inquiries now being received from many sources indicate a return of normal business and if the fall demand shows just a slight improvement over that of a year ago the trade will be well satisfied. During the past month much of the volume was made up on building trade grades. These have been in demand during the entire warm period and the outlook for fall also is good. Demand for summer specialties during the warm season has not been so good this year. The main reason for this is that this area has had no really hot weather.

Jobbers report good inquiries for the fine paper list. With the opening of schools just around the corner, some of this stock has begun to move. Books, ledgers and covers also have been asked for in preparation for the fall advertising campaigns. Printers here say there is a lot of direct mail work in prospect, waiting now for the change in seasons.

Common grades are moving only fair. The summer as a whole has been rather a disappointment in this line. Bags and wrapping papers are average with prices holding firm.

The container trade seems to be well situated. Trade during the summer has held steady with the ice cream industry taking large amounts of stock. Executives say inquiries show a possible demand from a more varied assortment of industries this fall than last. At present strikes among industries that are users of containers have dwindled to insignificant proportions and production in these plants is being speeded up.

Paper stock men report a fair mill demand, with prices holding firm, particularly on the better grades of rags and paper.

Government Paper Bids and Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Sept. 1 1937—The Government Printing Office has received the following bids for 20,000 pounds of 22½ x 28½ manila cardboard: Cauthorne Paper Company, 4.88 cents per pound; Dobler & Mudge, 6.5 cents; Old Dominion Paper Company, 5.09 cents; R. P. Andrews Paper Company, 4.6 cents; Graham Paper Company, 4.6; Whitaker Paper Company, 4.6 cents, and Reese & Reese, Inc., 4.9 cents.

For 450,000 pounds of supercalendered book paper in 38 inch rolls: R. P. Andrews Paper Company, 5.74 cents; Paper Corp. of U. S. 5.74 cents; Stanford Paper Company, 5.74 cents; Whitaker Paper Company, 5.74 cents, and John F. Post, Inc., 6.3 cents.

For 5,000 pounds of binders board: R. P. Andrews Paper Company, 5.3 cents; and Barton, Duer & Koch Paper Company, 5.525 cents.

The Whitaker Paper Company has been awarded the contract for furnishing 15,000 pounds of No. 2 kraft wrapping paper in 48 inch rolls at 4.41 cents per pound and also 25,000 pounds same in 36 inch rolls at the same price. The Cauthorne Paper Company will furnish 1,000 pounds of 19 x 24 basis, 24 inch rolls, of white stereotype molding paper at 11 cents. Bids for these items were received on August 6.

The National Pulp and Paper Company will furnish 40,000 pounds of newsprint paper in 24 inch rolls at 2.5 cents per pound and the R. P. Andrews Paper Company will furnish 37,000 pounds (17,900 sheets) of hard rolled binders board at 5.3 cents per pound. Bids for these items were received on August 4.

Cauthorne Paper Company will furnish 45,600 pounds of machine finish book paper at 6.06 cents per pound; R. P. Andrews Paper Company will furnish 6,320 sheets of 40 x 42, 25 per cent rag, blue bond paper at $27.50 per M sheets; and the same firm will furnish 500 sheets of 25 x 38 supercalendered paper at $790.00.

O. J. Naughton Visits Champion Mills

O. J. Naughton, of the Houston Division of the Champion Fibre & Paper Company, has just completed a three weeks' tour of the company's other mills in Canton, N. C., and Hamilton, Ohio.

HAMMERMILL AGENTS HOLD MEETING AT ERIE

(Continued from page 13)

DARTS—A. S. Wright.
OBSTACLE GOLF—F. E. Divine.
SELLING GAME—R. B. Keller.

Agent Prize Winners, Friday, August 27, 1937

GOLF—No. 1 Division: Low Gross, I. W. Carpenter, Jr.; Low Net, Bruce Barton; Second Low Net, Roscoe Taylor; No. 2 Division: Low Gross, F. B. Korbel; Low Net, Charles J. Babcock; Second Low Net, C. T. Roos.

OBSTACLE GOLF—First Prize—P. Manley; Second Prize, Alan Chandler.

BOWLING—First Prize, S. A. Harned; Second Prize, H. S. Wuenchel.

THE SELLING GAME—First Prize, S. B. Gaines; Second Prize, Jose Borrell; Highest Score, (single inning) W. Predmore.

DARTS—First Prize—D. A. Hoadley; Second Prize, H. B. Mayberry.

Hammermill Prize Winners, Friday, August 27, 1937

Winners of Final Events

GOLF—First Low Net, N. W. Wilson; Second Low Net, D. S. Leslie; Kicker's—first, G. Richardson; second, B. L. Kassing; third, W. F. Bromley.

BOWLING—F. Truesdale.

DARTS—Ray Hain.

OBSTACLE GOLF—E. O'Connor.

SELLING GAME—H. A. Obert.

SPECIAL DRAWING—B. J. Delaney.

Those in Attendance

Those who attended the meeting were as follows:

Herbert S. Krantz, The Alling & Cory Company, Buffalo, N. Y.; Martin L. Krantz, The Alling & Cory Company, Buffalo, N. Y.; James E. Alcorn, The Alling & Cory Company, Cleveland, Ohio; Paul C. Potts, The Alling & Cory Company, Cleveland, Ohio; Howard K. Weed, The Alling & Cory Company, N. Y.; W. J. Shaw, The Alling & Cory Company, Pittsburgh, Pa.; Alan Chandler, The Alling & Cory Company, Pittsburgh, Pa.; B. E. Reeves, The Alling & Cory Company, Rochester, N. Y.; Richard M. Harris, The Alling & Cory Company, Rochester, N. Y.; Harold L. Austin, The Alling & Cory Company, Rochester, N. Y.; Arthur C. Austin, The Alling & Cory Company, Rochester, N. Y.

R. P. Andrews, R. P. Andrews Paper Company, Washington, D. C.; W. N. Schaefer, R. P. Andrews Paper Company, Washington, D. C.; B. R. Moore, Andrews Paper House of York, York, Pa.; M. Keisewetter, Antietam Paper Company, Inc., Hagerstown, Md.; W. M. Baxter, Jr., The Baxter Paper Company, Inc., Baltimore, Md.; C. S. Lafferty, Beacon Paper Company, St. Louis, Mo.; R. L. Tillman, Beacon Paper Company, St. Louis, Mo.; G. A. Naumann, Beecher, Peck & Lewis, Detroit, Mich.; R. W. Roehm, Beecher, Peck & Lewis, Detroit, Mich.; E. L. Kramer, Beecher, Peck & Lewis, Flint, Mich.; Max Greenebaum, Beekman Paper and Card Company, Inc., New York, N. Y.; Theodore Greenebaum, Beekman Paper and Card Company, Inc., New York, N. Y.; L. A. Ramaker, The Bouer Paper Company, Milwaukee, Wis.; Charles Schuman, The Bouer Paper Company, Milwaukee, Wis.; Roscoe Taylor, Butler Paper Company, Inc., Fort Wayne, Ind.

S. B. Gaines, the Capital City Paper Company, Springfield, Ill.; L. V. Mulnix, Carpenter Paper Company, Grand Rapids, Mich.; R. R. Moser, Carpenter Paper Company, Oklahoma City, Okla.; Dewey A. Hoadley, Carpenter Paper Company, Omaha, Neb.; I. W. Carpenter, Jr., Carpenter Paper Company, Omaha, Neb.; R. C. Clark, Carpenter Paper Company, Omaha, Neb.; C. A. Esty, Carter, Rice & Co., Boston, Mass.; R. H. Welsh, Carter, Rice & Co., Boston, Mass.; H. A. Thayer, The Carter, Rice & Carpenter Paper Company, Denver, Col.; H.

PICTURES TAKEN AT THE 26TH ANNUAL CONFERENCE OF THE AGENTS OF

G. Boyer, Caskie Paper Company, Charlotte, N. C.; G. E. Caskie, Jr., Caskie Paper Company, Lynchburg, Va.; W. F. Boothby, the Central Ohio Paper Company, Columbus, Ohio; A. F. Miller, the Central Ohio Paper Company, Toledo, Ohio; W. N. Gillett, Chicago Paper Company, Chicago, Ill.; R. M. Clements, Clements Paper Company, Nashville, Tenn.; E. P. Magel, Crescent Paper Company, Indianapolis, Ind.; Fred F. Fox, Crescent Paper Company, Indianapolis, Ind.; Dana Payne, Daka Paper Company, Erie, Pa.

J. M. Knablein, Daka Paper Company, Erie, Pa.; J. M. Sturm, Diem & Wing Paper Company, Cincinnati, Ohio; A. L. Schneider, Diem & Wing Paper Company, Cincinnati, Ohio; C. M. Yates, the Dudley Paper Company, Lansing, Mich.; G. J. Kuebel, Durico Paper Company, Erie, Pa.; H. S. Wuenschel, Durico Paper Company, Erie, Pa.; J. M. H. Fitzgerald, Epes-Fitzgerald Paper Company, Columbia, S. C.; T. H. Epes, Epes-Fitzgerald Paper Company, Richmond, Va.; Merton C. Flemings, Charles A. Esty Paper Company, Worcester, Mass.; John J. Dorsey, F. A. Flinn, Inc., New York, N. Y.

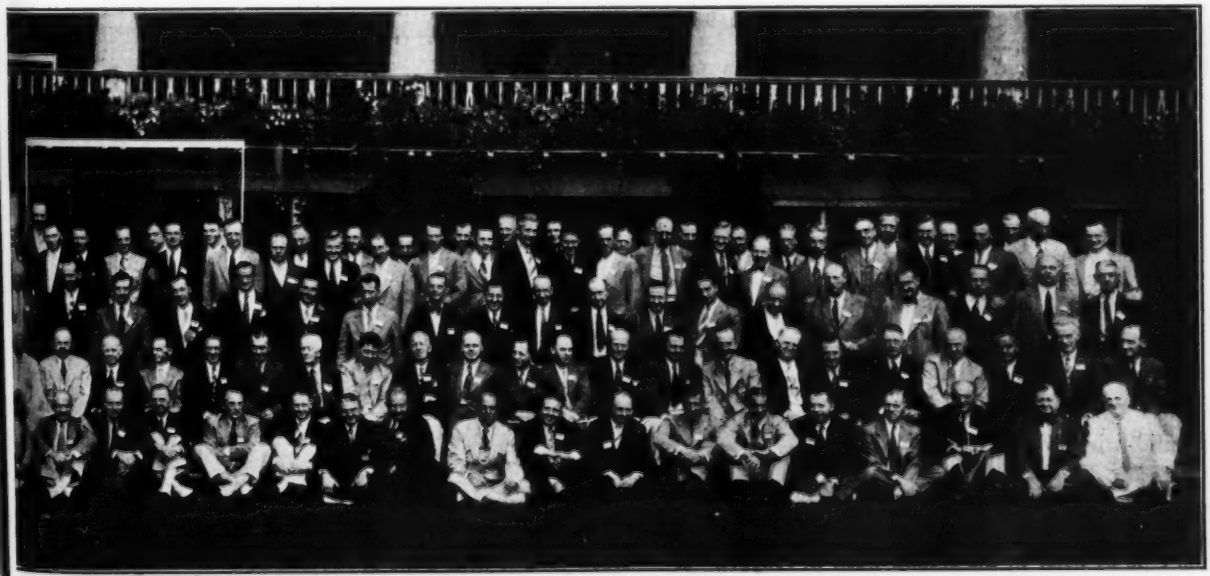
A. W. Green, Green & Low Paper Company, Inc., New York, N. Y.; Donald Gardner, R. L. Greene Paper Company, Providence, R. I.; Fred Stutzman, Holland Paper Company, Inc., Buffalo, N. Y.; Willard J. Blake, Holland Paper Company, Inc., Buffalo, N. Y.; George S. Clerk, Hudson Valley Paper Company, Albany, N. Y.; John B. Binley, Hudson Valley Paper Company, Albany, N. Y.; Sydney T. Jones, Hudson Valley Paper Company, Albany, N. Y.; H. T. Newell, Jackson Paper Company, Jackson, Miss.; H. G. Keffer, Johnston, Keffer & Trout, Harrisburg, Pa.; Brook Trout, Johnston, Keffer & Trout, Harrisburg, Pa.; Groh Hossler, Johnston, Keffer & Trout, Harrisburg, Pa.; W. P. Beene, Kansas City Paper House, Kansas City, Mo.; J. A. Carpenter, Kansas City Paper House, Kansas City, Mo.

D. C. Barry, Lathrop Paper Company, Inc., Newark, N. J.; P. W. Eason, Lathrop Paper Company, New York, N. Y.; T. S. Lathrop, Lathrop Paper Company, New York, N. Y.; F. P. Leslie, John Leslie Paper Company, Minneapolis, Minn.; D. J. Werner, Henry Lindenmeyr & Sons, New York, N. Y.; Charles M. Blake, the Papercraft Company, St. Louis, Mo.; R. M. Hughes, Megargee Brothers, Scranton, Pa.; Edward J. Lynn, Megargee Brothers, Scranton, Pa.; N. K. Woodward, Midwestern Paper Company, Kansas City, Mo.; Frederick P. Appleton, Miller & Wright Paper Company, New York, N. Y.; Robert Schmidt, Miller & Wright Paper Company, New York, N. Y.; Warren Williams, Miller Paper Company, Inc., Louisville, Ky.; R. S. Johnston, Old Dominion Paper Company, Norfolk, Va.; A. D. Cleveland, E. C. Palmer & Company, Ltd., New Orleans, La.; W. Predmore, Paper Merchants, Inc., Philadelphia, Pa.

O. Freile, Paper Merchants, Inc., Philadelphia, Pa.; H. F. Petrequin, the Petrequin Paper Company, Cleveland, Ohio; E. A. Petrequin, the Petrequin Paper Company, Cleveland, Ohio; G. N. Ernest, the Thomas W. Price Company, Philadelphia, Pa.; N. W. Fort, Jr., the Thomas W. Price Company, Philadelphia, Pa.; M. Reinhold, The Reinhold Card and Paper Company, New York, N. Y.; H. B. Mayberry, C. M. Rice Paper Company, Portland, Maine; Vose Barrett, S. P. Richards Paper Company, Atlanta, Ga.; W. A. Rhodes, S. P. Richards Paper Company, Atlanta, Ga.; Bulkley Van Schaack, the Rourke-Eno Paper Company, Inc., Hartford, Conn.; Arnold Russell, the Rourke-Eno Paper Company, Inc., Hartford, Conn.; Ernest C. Mead, Richmond Paper Company, Inc., Richmond, Va.

Richard S. Bull, Bradner Smith & Co., Chicago, Ill.; G. R. Likins, Springfield, Mo.; W. N. Stetson, Jr., Storrs & Bement Company, Boston, Mass.; John H. Brewer, Storrs & Bement Company, Boston, Mass.; John D. Swigart, Swigart Paper Company, Chicago, Ill.; E. R. Carpenter, Swigart Paper Company, Chicago, Ill.; Jake Nacht, Union Card and Paper Company, New York, N. Y.; C. R. Smith, Van Reed Paper Company, Reading, Pa.; S. Walter, S. Walter, Inc., Philadelphia, Pa.

C. A. O'Neill, D. L. Ward Company, Philadelphia, Pa.; Douglas Warner, O. F. H. Warner & Co., Inc.,



THE HAMMERMILL PAPER COMPANY AT ERIE, PA., AUGUST 26-27, 1937.

Baltimore, Md.; John R. Hedge, Western Newspaper Union, Lincoln, Neb.; E. W. Julian, Western Newspaper Union, Omaha, Neb.; E. L. Walters, Western Paper Company, Omaha, Neb.; V. E. Hecht, Zellerbach Paper Company, San Francisco, Cal.; Thomas Severson, Zellerbach Paper Company, Seattle, Wash.; Bruce Barton, Batten, Barton, Durstine & Osborn, Inc., New York City; C. J. Babcock, Batten, Barton, Durstine & Osborn, Inc., New York City; S. A. Harned, Batten, Barton, Durstine & Osborn, Inc., New York City; J. L. Trowbridge, Batten, Barton, Durstine & Osborn, Inc., New York City; F. L. Fisher, Central States Envelope Company, Indianapolis, Ind.; R. L. Allison, United States Envelope Company, Indianapolis, Ind.

E. V. Johnson, United States Envelope Company, Springfield, Mass.; F. B. Korbel, P. P. Kellogg & Co., Div., Springfield, Mass.; E. L. Wood, P. P. Kellogg & Co., Div., Springfield, Mass.; C. T. Roos, National Envelope Company, Div., Waukegan, Ill.; C. C. Walden, Jr., Walden, Sons & Mott, New York City; Jose Borrell, Walker, Goulard Plehn Company, Inc., New York City; Elwin Walker, Walker Goulard Plehn Company, Inc., New York City; Edward R. Broderick, Muller & Phipps (Asia) Limited, New York City; W. H. Howe, Buffalo, New York; Anthony Blank, Anthony Blank & Co., Buenos Aires, Argentina; H. E. Allen, the Dobeckmun Company, Cleveland, Ohio; P. S. Manley, the Dobeckmun Company, Cleveland, Ohio; A. O. Harris, Sales Analysis Institute Methods, Buffalo, N. Y.

Mills Receive New Straw Crop

DAYTON, Ohio, August 30, 1937.—The peak of the straw-baling season is at hand and huge truck loads of straw are now being moved from the wheat fields of the Miami Valley and Ohio to the paper and straw board mills for conversion into finished product.

It is said that the heavy movement of straw will continue for months as the surplus straw of the farms is baled up and trucked to the mills by the farmers, themselves, assuring them a neat income from this market. In many instances, because of bad growing conditions for wheat, the straw is proving to be a more profitable crop than the harvested wheat. Some of the wheat was of such poor quality that it was fed to the hogs, according to reports. However, there were many good stands of wheat in the Miami Valley and other sections of Ohio, and a fairly satisfactory average production was struck. Of course, the price was eminently satisfactory.

Much of the straw from the Fayette county district goes to the mills at Cedarville, near Xenia, and to Circleville, Ohio, where strawboard plants convert the raw straw into many products.

Thousands of tons of straw are handled each year in this manner as the surplus from Ohio farms is baled and moved to the mills. There are not as many straw plants in this section as there were many years ago, but there are quite a number still producing regularly each year. Most of them are located in counties within 75 to 80 miles of Dayton.

In order to meet this new situation, the "pick-up" baler has made its appearance, cutting the straw and baling it as it moves over the fields and kicking out the bales. Fayette county witnessed the first use of this type of baler in the second week in August. It promises to play an important part in harvesting the straw crop for the mills of this and other sections.

Obituary

Elmer G. Powers

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., August 30, 1937—Elmer G. Powers, sales manager of the George A. Whiting Paper Company, Menasha, Wis., died August 23 from injuries suffered in an automobile accident. His death occurred from a broken neck, on the way to a hospital.

Mr. Powers, accompanied by John W. Hewitt, Jr. and Mrs. James Sensenbrenner, of Neenah, Wis., had been at Lake Poygan for a field trial with hunting dogs. They were headed for Appleton, Wis., in a car owned by Mr. Hewitt and driven by Mrs. Sensenbrenner. The car failed to take a turn just outside of Appleton, and crashed into the brick gate post of St. Mary's cemetery. The other occupants of the car are recovering.

A native of Menasha, Wis., Mr. Powers was 35 years old. He started working for the George A. Whiting Paper Company in 1920 as a billing clerk. He moved up steadily until he became sales manager. He had an extensive acquaintance in the paper industry, and his death was a shock to many. For a number of years he served on the board of education of the City of Menasha. His widow and parents survive him.

Funeral services were held Tuesday, August 24, at the Laemmrich Funeral Home at Menasha, with the Rev. W. P. Mortell in charge. Burial was made in St. Margaret's cemetery at Neenah.

W. E. Dwight

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, August 30, 1937—W. E. Dwight, one of the founders of the Dwight Brothers Paper Company and who retired from the paper business a number of years ago, died at Berrien Spring, Michigan, early this month. Mr. Dwight was past sixty years of age. He was active head of the Chicago organization which he and his brother Austin founded in 1892 until he sold his interests a number of years ago to the present executives of the Dwight organization. Mr. Dwight began his interests in the paper industry as a boy when he worked in paper mills in various capacities.

Gandy Mill Destroyed by Fire

The Gandy Paper Mill, Lambertville, N. J., was almost wholly destroyed by fire recently.

How the fire started is not definitely known, and may never be as the whole plant appeared to be ablaze when the Lambertville firemen arrived on the scene.

No one was in the plant at the time the fire started. It was located on South Main street along the river.

Hamilton & Sons Install Machinery

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., August 30, 1937—W. C. Hamilton & Sons, Miquon, Pa. have awarded contract to General Electric Company, to install an Emerson Jordan with General Electric synchronous motor. A Bird screen, furnished by Bird Machine Company of East Walpole, Mass., is also being installed.

TAPPI to Visit Brunswick, Ga.

The Paper Makers Chemical Division of Hercules Powder Company has invited members of TAPPI to visit the company's naval stores plant at Brunswick on Thursday, October 21, following the Fall Convention in Savannah.

The first post-convention activity of the fall convention of the Technical Association will begin Wednesday, October 20, at 9:00 P. M. when members of TAPPI, who so wish, will leave Savannah on P.M.C. Special for Brunswick, Ga. The trip will include entertainment on the way to Brunswick, breakfast and an inspection trip of the naval stores plant Thursday morning, and luncheon and entertainment at the Cloister Hotel on Sea Island. Transportation will be furnished back to Brunswick Thursday evening. During the entire trip the participants will be the guests of the Paper Makers Chemical Division. Pullman reservations for the Savannah-Brunswick trip may be made now through the Hercules Powder Company. Baggage of those who wish to return home directly from Brunswick will be taken care of by attendants until Thursday evening. The ladies are especially invited to make the trip. The possibility of spending part of the day at Sea Island should be especially attractive.

The naval stores plant at Brunswick is the world's largest plant of this kind. Here rosin, pine oil and turpentine are extracted from pine stumps gathered from Georgia, Florida, Mississippi and Louisiana. After washing the stumps the wood is reduced to chips in a large rotary chipper. After shredding and crushing the wood goes to the extractors. In these 15-ton vessels the crushed chips are steamed and extracted with naphtha. Spent chips are transported to the power house where they are burned for fuel. The crude oils pass through filters to the refining equipment. Refining is accomplished by fractional distillation. Molten rosin secured this way is known as FF wood rosin. Further refining of this with selective solvents yields pale grades ranging from H to WG and a dark product known as Belro Resin. The plant is operated under highly developed technical control.

CLOISTER HOTEL, SEA ISLAND, GA.

Of interest to the guests, too, will be the history of St. Simon and Sea Islands. Before the Spaniards, St. Simon was one of the islands of Guale. The Indians were subjected by the Spaniards and a mission erected on St. Simon. This was later abandoned. After founding Savannah in 1733, James Edward Oglethorpe established an outpost on the northern part of the island. The fort and colony were known as Frederica. In 1742 occurred the Battle of Bloody Marsh, whereby the Spanish expedition from St. Augustine was ambushed and routed by Oglethorpe's Scotchmen. The Battle of Bloody Marsh ended the Spanish penetration northwards of Florida. Charles Wesley served as Oglethorpe's secretary and Minister of the Gospel in the little settlement of Frederica. The hardships of the frontier were too much for him, however, and he returned after a few months to Savannah and to England.

Sea Island is now Georgia's most famous beach. The island has been developed into a beautiful winter resort by Sea Island Company. The company owns and operates the Cloister Hotel, Cloister Apartments and the Cloister Casino.

BEACH AND CASINO AT CLOISTER HOTEL.

STUMP PULLER OF HERCULES POWDER CO.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Pulp and Paper Mills

General Construction News

Park Falls, Wis.—The Flambeau Paper Company has plans for expansion and improvements in power house at mill, including installation of new boiler unit and auxiliary equipment. Work is scheduled to begin soon. No estimate of cost announced.

Los Angeles, Cal.—The Johns-Manville Corporation, 22 East 40th street, New York, N. Y., manufacturer of insulating building board, asbestos board and kindred products, has plants nearing completion and will ask bids on general contract at early date for proposed new mill at Alameda avenue and 283rd street, Los Angeles, where company recently acquired a tract of about 50 acres of land, previously noted in these columns. It will consist of two main one-story units, 100 x 700 feet, and 100 x 310 feet, with wing extension, 60 x 90 feet, on last noted structure, and several auxiliary buildings. Entire project will cost close to $1,000,000, including equipment. Stone & Webster Engineering Corporation, 49 Federal street, Boston, Mass., and 601 West Fifth street, Los Angeles, is engineer. Albert C. Martin, Higgins Building, Los Angeles, is consulting architect.

San Francisco, Cal.—The Stecher-Taung Lithograph Corporation, 640 Battery street, manufacturer of folding paper boxes and containers, and kindred paper products, has completed plans for new two-story and basement addition to plant at Battery and Jackson streets, estimated to cost about $180,000, including equipment. Bids are being asked on general contract and award will be made soon. Jesse Rosenwald, 525 Market street, San Francisco, is consulting engineer.

Indianapolis, Ind.—The Beveridge Paper Company, 717 West Washington street, general paper products, plans rebuilding of portion of storage and distributing building, recently destroyed by fire, caused by lightning. Loss estimated close to $50,000, including equipment.

Bellingham, Wash.—The Puget Sound Pulp and Timber Company is concluding arrangements with the City Council for vacating several streets to provide for construction of proposed new additions to unbleached sulphite pulp mill, recently referred to in these columns, and on which it is proposed to begin work at early date. Site work will consist of dredging the Whatcom Creek waterway in front of company property, and the filling in of three city blocks, using silt from the waterway dredging for this purpose. Several large units will be erected, to be equipped for a rated capacity of 40,000 tons per year, increasing the mill rating to 100,000 tons per annum. The old Morrison mill of the company will be practically rebuilt in connection with the expansion program. Entire project will cost about $2,600,000. Company has arranged financing in amount of $2,500,000, through the sale of a block of preferred stock. Ralph M. Roberg is general manager.

Monroe, Mich.—Fire recently damaged a portion of mill of the Consolidated Paper Company, with loss reported as slight, approximating about $6,000. The damage will be replaced.

San Francisco, Cal.—The Schmidt Lithograph Company, Second and Bryant streets, manufacturer of glazed and coated paper stocks, paper boxes and containers, etc., has awarded general contract to K. E. Parker Company, 135 South Park street, San Francisco, for new six-story and basement addition to plant, at contract price of $150,291. Superstructure will be placed under way at once. Miscellaneous awards, also, are being made, including contract for sprinkler system to George M. Robinson & Co., 451 Folsom street, San Francisco. New addition will cost about $250,000, including equipment. Jesse Rosenwald, 525 Market street, San Francisco, is engineer.

Chicago, Ill.—The Downtown Waste Paper Stock Company, 915 South State street, has concluded negotiations for the purchase of a tract of property, 100 x 139 feet, at corner of Besley and Wabansia avenues, heretofore held by the Continental Diamond Fibre Company. The site is improved with three buildings, one of five stories in height, and the other two each two-story. New owner will take over property at once and will improve and occupy for new storage and distributing plant.

San Francisco, Cal.—The Field-Ernst Envelope Company, 45 Fremont street, manufacturer of commercial envelopes and kindred paper goods, has superstructure under way for new two-story paper-converting plant at Fifth and Tehama streets, recently referred to in these columns, and is awarding a number of miscellaneous sub-contracts for plumbing, heating, electrical and other work. New unit will be 80 x 275 feet, and will provide for large increase in present capacity. It is estimated to cost about $120,000, including equipment. General contract is being carried out by Cahill brothers, Inc., 206 Sansome street, San Francisco. Day & Michelsen, 405 Montgomery street, San Francisco, are architects.

Childs, Md.—Fire recently damaged a portion of the Marley mill, owned and operated by the Elk Paper Manufacturing Company. An official estimate of loss has not been announced. The damage will be replaced.

Berlin, N. H.—The Brown Company is running on a capacity production schedule, with present output on the basis of about 650 tons of pulp per day, about one-half of which is being used by the cellulose

"WE'VE TRIED EVERY VALVE MADE"

DIGESTER *Valve and* PRE-HEATER *Tube trouble in this Soda Pulp Mill finally corrected by using Monel . . .*

IF you're troubled by corrosion in Digester Valves and Pre-Heater tubes, read this letter from a Soda Mill, and see what happened before and after they turned to Monel.*

"Replying to your letter of April 21, 1937, we are handling carbonate of soda liquor. In years gone by we have spent considerable money trying to obtain suitable valves for our digesters. These valves control the steam, also the blowdowns. We have tried every valve made, and have even made our own, but our problem was finally solved by the Monel seats, discs and stems.

"With regard to the tubes, they are used in a pre-heater for spent liquor going to the evaporators. We purchased the heater with the evaporator in 1921. After the heater had run four or five years we had to get new tubes, and had to renew them a number of times until 1929, when we purchased Monel tubes. These tubes were 1½" O.D. x .083 x 85¼". Since installing them in 1929 we have had no trouble, no leaks. This is quite satisfactory, because we have a vertical heater and had to take it off the foundation and lay it on its side in order to take out the tubes and renew them."

In the alkaline pulping applications of Monel listed in the panel, experiences like those described are common. Why not check over the conditions in *your* mill, then write for specific information and suggestions. Also ask for "Monel in Pulp and Paper Mills," "Caustic Alkalies vs. Nickel and its Alloys," and the Mechanical Book "Strength Plus."

• • •

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Savannah, Ga.
October 18-20
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- Sectional Lining of Rotary Digesters
- Cooking Liquor and Steam Valve Trim
- Relief Line Screen
- Blow-off Valve Trim
- Diffuser Bottom Perforated Screen Plates and Wire Screens
- Cylinder Washers, Thickeners and Machine Cylinders†
- Pre-heater Tubes
- Evaporator Tubes
- Black Liquor Filters, Pumps and Valve Trim
- Caustic Evaporators (also Nickel and Nickel-Clad Steel)
- Circulating Pumps
- Lime Mud Filters
- Strainers in Caustic Settling Tanks
- Piping, Valves, etc.

†Just before going to press, the same soda mill advises that Monel wire on cylinders of these machines have a *life from ten to fifteen times* the life of wires used previously.

*Monel is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. This alloy is mined, smelted, refined, rolled and marketed solely by International Nickel.

MONEL

INCO MONEL

rayon industry. The mill is operating on a three-shift basis and will continue on this schedule for an indefinite period.

St. Louis, Mo.—The Keasbey & Mattison Company, Ambler, Pa., manufacturer of asbestos mill board products, asbestos paper goods, etc., has had plans completed for initial unit of proposed new branch plant at St. Louis, lately referred to in these columns, consisting of a one-story structure, 120 x 675 feet, for which superstructure will be placed under way soon. A number of smaller buildings will be built for general operating service. Entire project will cost close to $500,000, including equipment. United Engineers & Constructors, Inc., 1401 Arch street, Philadelphia, Pa., is engineer for project and will supervise building erection.

Niles, Mich.—The Niles Waste Paper Company, Front and Pokagon streets, is planning early rebuilding of portion of storage and distributing plant, recently destroyed by fire, with loss reported close to $25,000, including equipment.

Pine Falls, Man.—The Manitoba Paper Company, Ltd., a subsidiary of Abitibi Power and Paper Company, Winnipeg, Man., is reported planning early erection of new additions to mill at Pine Falls, to increase capacity about 300 tons. Project is estimated to cost over $750,000, including buildings and equipment.

London, England—Celotex, Ltd., London, affiliated with the Celotex Corporation, 919 North Michigan avenue, Chicago, Ill., manufacturer of insulating board products, wall board and kindred specialties, has placed a contract with Masson Scott & Company, Ltd., London, manufacturer of papermaking machinery, for equipment for proposed new mill in the Wembley district, near London, recently referred to in these columns, and on which work will be placed under way soon. The machinery installation, the first of its kind to be built in England, will provide for a rated annual output of 3,500,000 lineal feet of insulating board per month. The plant will comprise several one and multi-story units, and is estimated to cost close to $1,250,000. S. Warwick, 4 Cockspur street, S.W., London, is architect for project.

Little Chingan, Manchuria—The Japanese Oji Paper Manufacturing Company, Tokyo, Japan, is projecting plans for the construction of a large pulp mill in Little Chingan, to utilize the timber resources in that part of Northern Manchuria. Plant will consist of several large one and multi-story units, with power house, machine shop and other mechanical structures, and is estimated to cost over $3,500,000, with equipment. Facilities will be provided for extensive timbering operations, including sawmills and other plant buildings. The Manchurian Forestry Administration, Mukden, Manchuria, is interested in the project.

Chesapeake-Camp Build Railway

[FROM OUR REGULAR CORRESPONDENT]

SUFFOLK, Va., August 30, 1937—The Camp Manufacturing Company, of Franklin has secured the rights of way for a rail line from its Dismal Swamp property to that place for the transportation of logs to the saw mill and the new pulp plant now under construction. The railroad will be standard-gauge and will be approximately 20 miles long. It is to be of all-steel construction.

A. C. S. Cellulose Division to Meet

The Cellulose Division of the American Chemical Society will hold sessions at the Eastman School of Music, Rochester, N. Y., on September 9-10, 1937. Emil Heuser, Chairman, will preside. The papers to be presented are as follows:

Chemistry of Wood Derivatives, by R. F. Conway.

Purification of Wood Cellulose, by Fred Olsen.

The Physical Properties of Cellulose Derivatives, by H. W. Spurlin.

Solubility, Softening and Moisture Absorption of Cellulose Ethers as a Function of Their Composition, by E. J. Lorand.

The Viscosity and Optical Rotation of Cellulose Dispersed in Cuprammonium Solution, by Jack Compton.

Homogenity and Properties of Nitrocellulose, by H. M. Spurlin.

The X-Ray Diffraction Behavior of Cellulose Derivatives, by W. A. Sisson.

The Concentration of Sodium Hydroxide Necessary for the Mercerization of Different Cellulose Fibers, by J. R. Katz.

X-Ray Studies of Lignin, by E. E. Harris, E. A. Parker, E. C. Sherrard and G. L. Clarke.

Observations with the Spierer Lens, by L. H. Smith and F. F. Morehead.

Studies of Cellulose Hydrolysis by Means of Ethyl Mercaptain, by M. L. Wolfrom and L. W. Georges.

Recent Developments in Wood Hydrolysis, by Edward Farber.

Composition of Cocoanut Shells, by L. C. Fleck, W. G. Van Beckum and G. J. Ritter.

Acid Pulping of Southern Pine I, Sulphite Pulps for Viscose Manufacture, by Charles Carpenter and Frank McCall.

The Effect of the Pretreatment of Spruce Wood on the Reaction in the Sulphite Process, by D. C. Brown and F. E. Brauns.

The Cooking Process, S. Pulping Wood with Alcoholic Nitric Acid Solutions, by S. I. Aronovsky and R. A. Gortner.

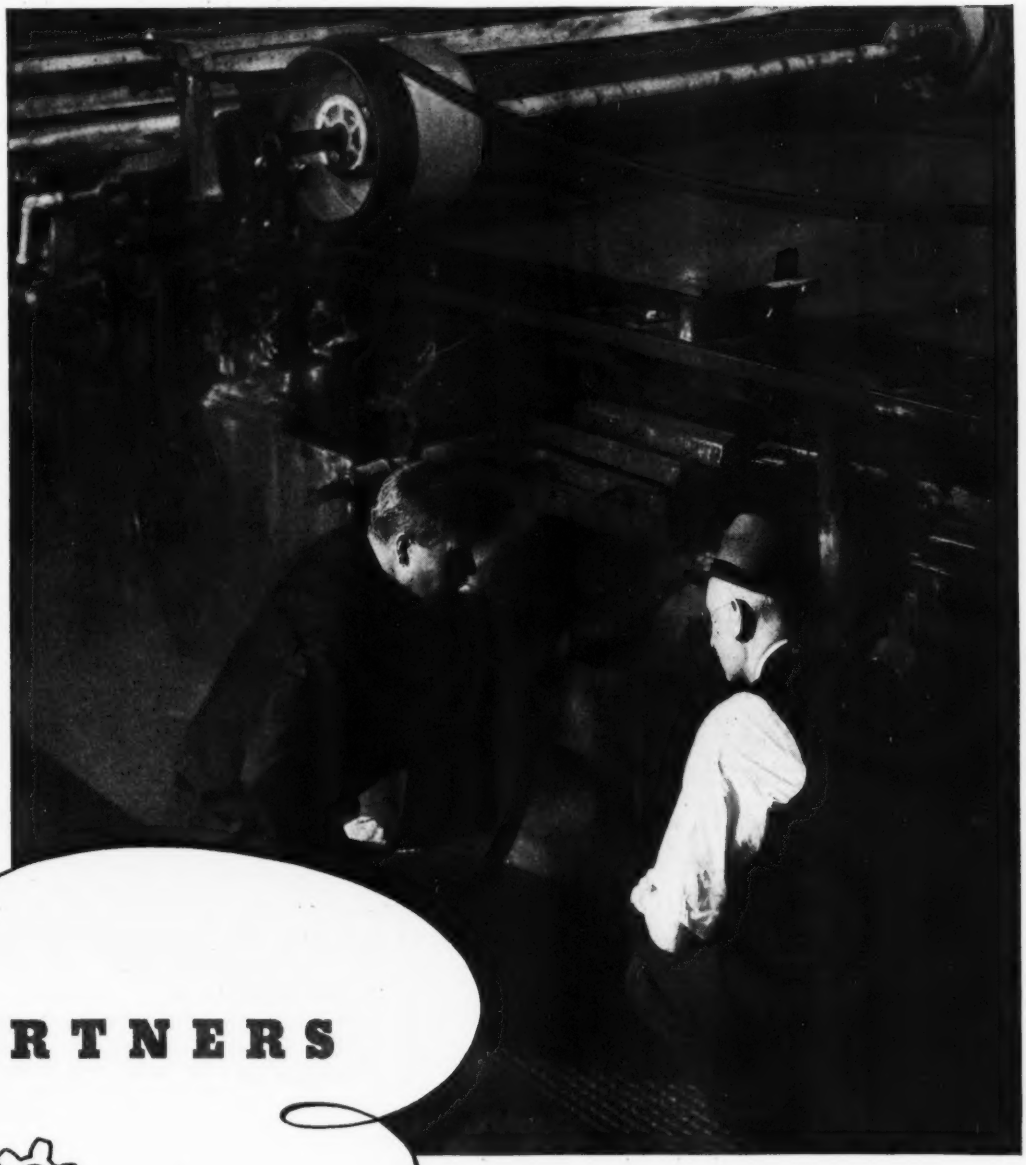
Pulping Bagasse with Alcoholic Nitric Acid, by S. I. Aronovsky and D. F. J. Lynch.

Mechanism of the Reaction of Bromine with Furfural and its Derivatives, by Elizabeth E. Hughes and S. F. Acree.

Founding of D. M. Bare Paper Co.

The D. M. Bare Paper Company is now mailing out the second in a series of broadsides entitled the Legend of Roaring Spring. The second display piece is called the Founding of the D. M. Bare Paper Company and outlines the history of the mill from 1867 and the founding of the town of Roaring Spring, then known as Spangs Mills. This broadside is printed on 75 lb. Ruskin Super. It is printed with Essyew Duotone Autumn Green ink.

The front cover shows a sketch of the mill as it is today, while the inside pages depict a map of Spangs Mills, now Roaring Spring, as it looked in 1867 when the Mill had just been completed. On the back cover an actual reproduction of the business card used about 1880 by Morrison, Bare & Cass is shown, this being the name of the company at that time. The reverse side of this calling card shows the Roaring Spring mill and the mill at Tyrone.



PARTNERS

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COMING EVENTS IN THE PAPER INDUSTRY

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY—Fall Convention, DeSoto Hotel, Savannah, Ga., Oct. 18-20, 1937.

NEW ENGLAND SECTION, Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Nonotuck Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION, Technical Association of the Pulp and Paper Industry—Fourth Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION, Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION, Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park-American Hotel, Kalamazoo, Mich.

FOREIGN PAPER TRADE OF U. S. HIGHER FOR FIRST SIX MONTHS OF 1937

Exports of paper and paper manufactures from the United States totaled $15,145,695 for the six months ended June 30, 1937, according to figures just released by the Forest Products Division of the Bureau of Foreign and Domestic Commerce. This figure represents an increase of 37 per cent over the amount recorded for the corresponding six months in 1936, and while some of this gain is due to the higher average export prices obtained, it may be observed that with the exception of newsprint paper and box boards, the volume of shipments of all classes was also higher than for the same period last year. In the fine paper group, exports of book papers were more than double, exports of surface-coated papers higher by 35 per cent and exports of writing papers higher by 31 per cent than for the first half of 1936. Exports of cover papers and bristols, minor items in this group, rose by 48 per cent and 58 per cent respectively. In the wrapping paper field, exports of greaseproof and waterproof papers increased by 25 per cent and exports of kraft wrappings by 37 per cent this year. Shipments of over-issue newspapers, which go chiefly to the Far East where they are used as a substitute for wrapping paper, also show a heavy increase, being 53 per cent higher than a year ago.

Exports of boxboards during the current year have been running behind those for corresponding periods in 1936 and a heavy increase in the June shipments was insufficient to offset earlier losses. A decline of 10.5 per cent in the six months' shipments of this particular class was more than offset by a rise of 2,000 tons or 36.6 per cent in exports of other paperboards. Exports of boxes also increased 24 per cent. Building products are among the items which have picked up considerably this year. Wall board exports show only a slight gain, less than 5 per cent, but shipments of fiber insulating boards were 30.8 per cent higher and of sheathing paper 87 per cent higher than during the first half of 1936.

In addition to paper, the United States shipped to foreign countries paper base stocks to the value of $8,657,735, as against $5,461,713 during the first six months of 1936. This increase is largely due to the rise in exports of bleached sulphite pulp, which were more than 50 per cent higher than during the first half of 1936. Shipments of rags and other waste also show a considerable gain over last year. Shipments of the former were 74 per cent higher and of the latter 167 per cent higher than during the corresponding period last year.

Imports of paper and manufactures into the United States during the first six months of 1937 were valued at $64,056,936, an increase of 26.4 per cent over the first half of 1936. Newsprint paper as usual accounted for nearly 90 per cent of these imports and was chiefly responsible for the rise in the value of the total receipts. Importations of this particular item up to the end of June totaled 1,546,595 tons, an increase of 21.5 per cent over last year. Owing to the higher prices in effect since the first of the year, the value, $56,853,342, shows an increase of 28.3 per cent for this period.

Other paper imports had an aggregate value of only $7,203,594, an increase of 13.5 per cent over 1936. Increases occurred chiefly in imports of printings other than newsprint, greaseproof and waterproof papers, miscellaneous wrappings, uncoated tissues, boards, and cigarette papers. Imports of kraft papers again rose during June but not sufficiently to bring the six months total up to the level of the same period last year. Imports of this article amounting to 10,363 tons were 15.7 per cent under the amount recorded for the first six months of 1936.

Imports of nearly all classes of paper base stocks have been higher during the first six months of the current year. Pulpwood receipts show a rise in volume of 35 per cent and in value of 45 per cent. Wood pulp receipts show a rise in aggregate volume of 14 per cent. The heaviest increase in this group occurred in imports of unbleached sulphite which were 26 per cent higher than last year. Increases of ap-

proximately 10 per cent occurred in imports of bleached sulphite and bleached sulphate. Imports of kraft pulp on the other hand, were only 2 per cent higher than in 1936. In the waste group, imports of rags for paper stock declined by 6 per cent, a reduction about offset by an increase of 19 per cent in imports of other classes of waste.

Total imports of paper base stocks during the six months ended June 30, 1937, were valued at $54,526,544, comprising 538,341 cords of pulpwood valued at $3,996,231, 1,165,782 tons of wood pulp valued at $46,156,081, and 108,912 tons of rags and other waste valued at $4,374,232. Imports during the first 6 months of 1936 were valued at $43,764,336, comprising 397,817 cords of pulpwood valued at $2,817,450, 1,023,585 tons of wood pulp valued at $37,475,562, and 107,992 tons of waste valued at $3,471,324.

Against Rapid Expansion in South

The advisability of continued expansion of the pulp and paper industry in the South was questioned in a statement by E. L. Demmon, director of the Southern forest experiment station of the United States forest service at New Orleans.

"It might appear to the casual reader of press items regarding this development that each additional plant, bringing new capital to the South as well as new opportunities for the sale of forest products and for the employment of labor, would be a distinct asset," Dr. Demmon said.

"There are, however, other aspects of the problem that are worthy of consideration such as the ability of the forests of the South to support these additional plants and the desirability of producing pulpwood at the expense of other forest products. It is important that these phases of the problem be carefully weighed before an undue expansion of forest industries results."

There are 44 existing and definitely projected pulp mills in the South, according to a survey by Robert E. Winters, forester, of the experiment station.

Experiment station officials expressed a doubt that "these plants were located after careful consideration of the ability of the forest to meet the needs of the proposed plants in addition to the already established forest industries."

Imperial Paper Co. Elects Officers

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., August 30, 1937—The annual meeting of stockholders of the Imperial Paper and Color Corporation was held here this week for the purpose of electing officers and directors for the year. Among those reelected as directors were A. F. Brown, Louis P. Brown, D. H. Cowles, A. S. Frazier, K. R. McBride, J. H. Pearsall, J. E. Singleton, F. Van Sittert and M. C. Wilmarth, all of Glens Falls; William Rohe, of New York City, and A. L. Emerson, of Warrensburg. A newly elected member of the board is George S. Knapp, sales manager of the pigment color division for several years. Officers elected were Karl R. McBride, president; D. H. Cowles, vice-president; J. H. Pearsall, treasurer; M. C. Wilmarth, secretary.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES

Months	1937	1936	1935	1934
January	90.3% (c)	76.1%	65.8%	.....
February	90.1% (c)	77.9%	70.0%	.....
March	90.3% (c)	76.0%	70.5%	.....
April	92.1% (c)	82.3%	70.0%	.....
May	90.6% (c)	81.6%	69.4%	.....
June	87.4% (c)	80.7%	72.3%	.....
July	82.4% (c)	77.3%	64.9%	.....
August	.....	81.5%	70.9%	.....
September	.....	80.5%	71.9%	58.2%
October	.....	87.6%	75.6%	64.7%
November	.....	88.0%	75.3%	61.7%
December	.....	85.9%	71.2%	59.6%
Year Average	.....	81.3%	70.5%	.....
Year to Date First 33 weeks	88.4% (c)	78.9%	69.1%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS 1937		CORRESPONDING WEEKS, 1936	
*August 7	82.7%	August 8	80.2%
*August 14	80.0%	August 15	80.9%
*August 21	81.9%	August 22	81.4%

The following statistics show the number of mills reporting by ratio groups:

Ratio Limits	Number of Mills Reporting Current Weeks: Aug. 7, 1937	Aug. 14, 1937	Aug. 21, 1937
0% to 50%	66	72	48
51% to 100%	241	214	171
Total Mills Reporting	307	286	219

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported on January 4, 1937 Machine Improvement Survey.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours", were as follows:

Mos.	1937	1936	1935	1934	Mos.	1937	1936	1935	1934
Jan.	80% (e)	61%	61%	....	July	67% (e)	69%	59%	....
Feb.	86% (e)	67%	67%	....	Aug.	....	75%	65%	....
Mar.	87% (e)	68%	67%	....	Sept.	....	76%	69%	62%
Apr.	89% (e)	70%	61%	....	Oct.	....	82%	76%	63%
May	86% (e)	68%	61%	....	Nov.	....	79%	70%	56%
June	75% (e)	68%	65%	....	Dec.	....	74%	60%	52%

Week end. Aug. 7, 1937—73% Week end. Aug. 14, 1937—75%
Week end. Aug. 21, 1937—73%

(e) Basic figures revised to include new members of the National Paperboard Association.

English Newsprint Prices Up

MONTREAL, Que., August 30, 1937.—English mills are quoting a price equivalent of $62.25 per short ton for new 1938 contracts, the Newsprint Association of Canada has informed Canadian manufacturers. This compares with the 1937 contract price of $44.46, an increase of $17.79.

The Association also states that revisions have voluntarily been made in existing contracts for 1938 delivery, which were signed at £10 sterling and have now being fixed at 11£ 10s, an increase of $6.67 to an equivalent of $51.13.

Want To Buy Large Pulpwood Reserve

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., August 20, 1937.—According to a story printed here, the Consolidated Paper Corporation has been approached by certain parties with a view to the purchase by the latter of Anticosti Island, in the Gulf of the St. Lawrence. The island covers 3,100 square miles and is estimated to contain 15,000,000 cords of pulpwood. It is held by the company as a valuable pulpwood reserve, and at the same time it is one of the finest fish and game preserves in Eastern Canada.

THAT'S A LOT OF BULK
WHEN Hezro Davis says he has loaded more than a billion pounds of bulk soda ash in the years he has worked at Saltville, he is making no idle boast. He is simply stating a fact—a fact of which he is justly proud. Davis is proud of this record not just because it tells how well he has been doing his part to insure the safe arrival of bulk shipments of Mathieson Soda Ash. He is proud of what it tells about his company, too. For how could such volume be possible, Davis reasons, had not Mathieson been doing an outstanding job of producing good soda ash and giving good service to customers?
The MATHIESON ALKALI WORKS (Inc.), 60 East 42nd St., New York, N.Y.
Mathieson Chemicals
SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . HTH AND HTH-15 . . . AMMONIA, ANHYDROUS AND AQUA . . . PH-PLUS (FUSED ALKALI) SULPHUR CHLORIDE . . . CCH (INDUSTRIAL HYPOCHLORITE) . . . DRY ICE (CARBON DIOXIDE ICE)

Section of the
Technical Association
of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Studies on Fiber Structure: Physical and Chemical Characteristics of Skin Substance or Cementing Material *

By Friedrich E. Brauns[1] and Harry F. Lewis[2]

In a paper presented before the annual meeting of the Technical Association three years ago, Carpenter and Lewis *(1)* described certain changes occurring in the structure of wood fibers during cooking and bleaching. We quote from that paper:

"The first stage in the cooking process appears to result in a splitting of the middle lamella which frees the individual fibers and leaves each with an outer layer or sheath of material which is insoluble in 72 per cent sulphuric acid.

"In the second stage, this lignin layer or sheath is removed, exposing as the outer layer of the fiber a transversely wound layer of cellulose fibrils; an integral part of this, or immediately beneath, is the outer elastic membrane which surrounds the secondary lamella of the fiber. The effect of the swelling agent on such a fiber is to produce characteristic bead-like swelling with the elastic outer membrane forming the skin of the balloon.

"As the result of over cooking, this membrane substance is modified chemically or physically in such a way as to lose its elasticity. At the same time, it is more readily attacked by the cuprammonium solution and fibrillation results. . . .

"The first stage in a normal bleaching process consists in the removal of last traces of the 'lignin layer' or sheath . . . Over bleaching modifies the membrane in such a way that it is more readily dissolved by the swelling agent. "Incidentally, changes in fiber structure go along with changes in strength of handsheets made from these fibers. The possible relation between the condition of the skin substance and the sheet strength is indicated."

As a second stage in a general fundamental study of fiber structure and especially of the changes taking place in fibers on cooking and bleaching which is being carried on at The Institute of Paper Chemistry, the isolation and examination of what has been termed "skin-substance" by a number of investigators seemed to be highly desirable.

In order to purchase necessary equipment and to provide other assistance for this project, the Educational Cooperation Committee of TAPPI made a grant of one thousand dollars on October 28, 1935, and The Institute of Paper Chemistry likewise made an appropriation from its fundamental research funds to cover the cost of the laboratory service and salaries over the amount in the grant. This report describes the progress made on the problem.

The first step in a study of the chemical nature of the skin substance involves the isolation of the material. The pulp selected for study was a well and carefully bleached western hemlock sulphite from which the medullary rays and other short-fibered material had been removed by fractionation. Pulp from this source had the following chemical constants:

Alpha-cellulose	85.3	per cent
Cross and Bevan cellulose	98.2	per cent
Pentosans	3.8	per cent
Lignin	1.9	per cent
Copper number	2.05	per cent
Viscosity	40.0	per cent

Three ways, at least, for isolating the material presented themselves:

(1) Solution of the cellulose by hydrolysis with strong acids.

(2) Solution of the cellulose in cuprammonium hydroxide or other "cellulose solvents".

(3) Solution of the skin substance in appropriate solvents.

(1) According to Lüdtke, the skin substance is resistant to strong acids, and consequently an experiment was carried out to isolate the substance according to Sakostschikoff *(2)* with 94 per cent sulphuric acid. Forty grams of the shredded pulp was added to two hundred cc. of 94 per cent sulphuric acid at room temperature and immediately carefully mixed until the mixture was homogeneously liquid, which occurred after 45 minutes. To this mixture another 40 grams of pulp was added and well mixed. After about two hours, the highly viscous mass turned to a homogeneous black liquid, which was mixed with 800 cc. of ice water. The solution was then centrifuged, whereby a small amount of dark brown precipitate separated out, which was washed with water until it reacted neutral, and finally filtered on a porcelain filter and dried. The yield of nearly black horny powder was 1.9 grams

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or 2.4 per cent. The product had a methoxyl content of 6.3 per cent and an ash content of 7.8 per cent. The high yield, the high methoxyl, and the high ash content showed that whatever skin substance was present was contaminated with lignin, ash, and probably humic acids. Because of this, the method was abandoned.

(2) In line with observations made at The Institute of Paper Chemistry and by other investigators, the undegraded skin substance seems to be fairly resistant to the solvent action of strong cuprammonium hydroxide, and it therefore appeared possible to separate the skin substance by dissolving out the cellulose and other carbohydrates (according to the literature, mannan and xylan are also soluble in this solvent) by means of cuprammonium hyroxide solution. An attempt in this direction had also been carried out by Lüdtke using bamboo pulp, but the residue, consisting chiefly of fragments of epidermus cells and vessels, was so small that it was discarded.

(3) Preliminary experiments indicated that the best procedure would be to prepare a five to six per cent solution of the pulp in strong cuprammonium solution, dilute this with six volumes of distilled water and finally remove the insoluble material by centrifuging at a fairly high speed. The specific methods employed are as follows:

Cuprammonium solutions containing 30 grams of copper and 110 of ammonium hydroxide per liter were prepared by bubbling air carrying ammonia gas through concentrated ammonium hydroxide (sp. gr. 0.90) in a tower filled with very fine copper wire at a temperature well below zero. Solutions were made in a one gallon bottle by adding 125 grams of the pulp to two liters of the special cuprammonium solution and revolving the bottle with its contents on the regular viscosity wheel from 18 to 20 hours. Under these conditions the pulp combines with the solvent to form a homogeneous mixture which is very likely a gel. This is then diluted with 12 liters of distilled water and the dilute solution shaken for 12 hours. On standing over night, a light blue flaky substance settles slowly. The solution is then centrifuged at 2500-3000 r.p.m. for a half hour and the various residues thus obtained are all placed in one centrifuge jar for washing with fresh cuprammonium solution. For washing, the centrifuging jar is provided with an air-tight stopper (to prevent the loss of ammonia), to which a motor-driven stirrer has been fitted, and the washing operation carried out by stirring the residue with cuprammonium solution for two hours. After this time the suspension centrifuged, the used wash liquor decanted, fresh solution added, and the process repeated five or six times, using 80 cc. of fresh solution each time, until the solution removed proves to be free of cellulose, as indicated by a clear solution after acidification. The product is then washed successively, twice with 1:1 ammonium hydroxide, with alcohol, ether, and finally petroleum ether, and then dried in a desiccator over sulphuric acid.

Yield from Three Experiments

The yield from three such experiments was 1.7 grams, 1.6 grams and 1.8 grams, averaging 1.36 per cent on the oven-dry pulp. When slightly moist, the product is a grayish blue powder, which changes to a light blue on drying over night (due possibly to the loss of ammonia). Upon analysis, the above preparations were shown to yield 32.8, 32.2, and 30.3 per cent of copper oxide, respectively; and copper appears to be present in some form of chemical combination as indicated by the fact that the values do not change when the product is further washed with ammonia.

The next step in the purification of the freshly isolated compound, after washing it with ammonium hydroxide and water, is to acidify it with acetic acid or dilute hydrochloric acid, whereby it is hydrolysed to a grayish precipitate and a greenish blue solution. After the precipitate has been removed from the solution by centrifuging, the clear solution is dialyzed towards distilled water. As dialysis proceeds, the solution sets to a solid gel, which, on standing, loses water (syneresis). After copper can no longer be detected in the outside water and the contents of the dialyzing bag react neutral, the gelatinous material is precipitated by pouring the mixture into absolute alcohol. The product then separates out as a white powder, which is removed by centrifuging, washed successively with alcohol, ether, and petroleum ether, and dried in a desiccator over sulphuric acid and sodium hydroxide. The material thus obtained still contains 0.46 per cent ash, due probably to some copper being absorbed by the gel, in spite of ten days of dialysis. An attempt is now being made to decrease this ash content by electro-dialysis.

Characteristics of the gel-forming material

The analysis of three different preparations made in this fashion gave a mean value for carbon of 44.2 per cent and for hydrogen of 6.25 on the ash-free basis, while the respective figures for cellulose are C 44.44 per cent and H 6.17 per cent. Tests for uronic acids and methoxyl were negative.

The white powder obtained after drying over phosphorous pentoxide at 100 deg. C. is difficultly soluble in water and is insoluble in alcohol, pyridine, and acetic acid.

An attempt was first made to acetylate this material, but a soluble acetate could not be obtained with pyridine and ecetic anhydride. When the gelatinous material is first dehydrated with acetic anhydride and then acetylated by the addition of pyridine, the acetylation product separates as a horny, insoluble mass, very much as that from the dextrans.

On hydrolysis with fuming hydrochloric acid (42 per cent), the product dissolves to give a clear solution which is colored a faint blue by the presence of a trace of copper. The copper is removed as the sulphide by precipitating with hydrogen sulphide, the colorless solution thus obtained reducing Fehling's solution strongly. A quantitative estimation for reducing sugars in this solution, carried out by a modification of the Munson-Walker method, indicates a yield of 97 per cent of reducing sugar (glucose), based on the weight of original solid. Qualitative micro tests for mannose and fermentation tests for galactose on the hydrolysate indicated the absence of those sugars. Further work is being carried out to establish these facts beyond question. This will require additional study of the analytical methods.

The determination of sugars fermented by yeast indicated that less than half of the material was fermentable. The actual calculation points to the presence of 45 per cent of material thus fermentable.

A micro pentosan determination by the dinitrophenylhydrazine method revealed the absence of pentosans by that test.

Changes in Characteristics

The original blue copper compound changes in characteristics on drying so that it will no longer decompose with dilute acids to form the solution from which the white gel separates, but rather a gray gelatinous precipitate is obtained, which, on drying, yields a horny product containing 45.16 per cent carbon and 6.3 per cent hydrogen, calculated on the ash-free basis. The methoxyl content is 0.94 per cent. When this material is further hydrolysed

by strong hydrochloric acid, a lignin-like precipitate containing 2.1 per cent methoxyl is obtained, and at the same time a filtrate is obtained which strongly reduces Fehling's solution. The amount available at the present time is too small to permit further characterization, but additional copper compound is being obtained on a larger scale which will enable a more complete study.

The Analytical Constants

While the membrane work was in progress, a highly purified spruce wood pulp of unusual characteristics was sent to the Institute. The analytical constants were as follows:

Alpha-cellulose	99.1	per cent
Beta-cellulose	0.52	per cent
Gamma-cellulose	0.38	per cent
Pentosans	0.70	per cent
Ash	0.077	per cent
Copper number	0.049	per cent
Viscosity	32.1	per cent

Because of the unusual purity, it appeared that an investigation of the beating and swelling characteristics and of the skin substance would be well worthwhile. Consequently, a regular beater run was made, using the Valley beater under standard conditions. Beating was continued for 90 minutes and during this time neither the freeness dropped nor did the stock hydrate. In addition, the handsheets obtained were so weak that they could not be handled. This was interesting in the light of the fairly high viscosity of the pulp.

The pulp was then subjected to the same treatment with cuprammonium solution as was the West Coast sulphite, using 150 grams of pulp. An extremely small amount of insoluble material was obtained, which indicated that the substance giving the blue copper-containing precipitate had been largely removed from the pulp. The swelling characteristics of a similar pulp proved to be even more interesting, for on treatment with cuprammonium solution, the various concentric cylinders of cellulose in the fiber seemed to separate rather easily from each other, just as though the material separating these layers in the secondary lamella had been removed in the process of making and purifying the pulp.

A third series of experiments have more recently been initiated, based upon the observations made by Mrs. Farr that pectin solvents remove membrane material from young cotton fibers. In this work we are utilizing dilute ammonium oxalate solution under the conditions of extraction described by Mrs. Farr, and are treating both the original and the extracted material with cuprammonium solution according to the above technique, to determine whether or not the material which is removed from pulp fibers by dilute ammonium oxalate solution is similar to the material which remains insoluble in the cuprammonium solution under the conditions of test. This work is still in its earliest stages.

In carrying out this work, sufficient pulp is being extracted to carry out not only the cuprammonium treatments but also to make a study of the physical and chemical characteristics of the extracted pulp. The results to date may be summarized by stating that 0.5 per cent ammonium oxalate solutions at 95 deg. C. extract only very small amounts of materials from bleached sulphite pulps. The extracted pulp has almost the same chemical constants, including viscosity, as does the original pulp, and its beating characteristics are likewise similar. The same holds for the behavior of the original pulp and extracted pulp in cuprammonium solution. This is interesting in the light of the earlier experiments with the original West Coast pulp and the highly purified pulp which indicated that the removal from the pulp of the material insoluble in cuprammonium might be related to ease of beating the pulp.

Summary and Conclusions

Early experimental work on the swelling of pulp fibers with strong cuprammonium solution indicated that a substance could be isolated from a fiber by swelling with strong cuprammonium solution which had all the physical appearance of the membrane surrounding the fiber. The technique of swelling under these conditions has been improved and developed for large-scale operation in such a way that this insoluble material may be collected for investigation. The material which is insoluble under these conditions proves to be a copper complex of a carbohydrate material. Upon hydrolysis, this copper complex breaks up to give a blue solution and an insoluble grayish precipitate. The blue solution has been purified by dialysis so that copper and other ash constituents have been removed to the point where the recovered solid contains 0.46 per cent of ash. As these solids are removed, there forms a white gel in the dialyzing bag. This gel has been precipitated and separated in the form of a white powder. Tests on the powder indicated the absence of methoxyl groups and of uronic acids. The white solid hydrolysed with fuming hydrochloric acid to form a solution having a reducing value of such an amount as would indicate a yield of at least 97 per cent reducing sugar, calculated as glucose, from the solid. The hydrolysate shows no tests for either mannose or galactose, although the amount available up to the present time has been insufficient to establish this with absolute certainty. The solution after hydrolysis ferments readily with yeast, and after fermentation the reducing value has dropped to 55 per cent of the original value, indicating that 45 per cent of the reducing sugars are fermentable hexoses.

The original insoluble material on drying changes its characteristics so that it will no longer hydrolyze with acid. Further amounts of this are being prepared for study, for in it there appears to be not only the carbohydrate material described above, but also a small amount of material containing methoxyl groups and behaving in some ways very much the same as does lignin. When the same technique is carried on with the wood pulp which contains 99.1 per cent alpha-cellulose and has a pentosan content of 0.70 per cent, the amount of insoluble material is extremely small. Beater tests on this pulp showed that it hydrates with extreme difficulty, and the sheets formed from it have very low strength. This is in line with the earlier observations of Carpenter and Lewis, relating the condition of the membrane to the strength of the paper.

It is a matter of interest that this pulp shows a good viscosity in spite of its lack of strength. These observations would appear to support the belief that the viscosity of a cellulose cuprammonium solution is due, in part at least, to the viscosity of the cellulose itself in the cuprammonium and also indicates that the viscosity value may not always be used in predicting strength when the pulp being tested has been prepared under conditions which are different than those ordinarily used commercially.

Prolonged treatment of the bleached sulphite pulp with a pectin solvent, such as dilute ammonium oxalate solution at 95 deg. C., is also being studied as a means for the removal of membrane. Extraditions have been made, and physical and chemical tests have been carried out on the products. This work is in progress at the present time.

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The Application of Micro-Analysis to Identification of Specks in Pulp and Paper*

By B. L. Browning[1]

Abstract

Micro-analytical methods have been applied to pulp and paper specks as an aid to exact identification. Extractions with ether, alcohol, or other organic solvents may be carried out quantitatively. Quantitative determination of the amount of ash and qualitative analysis of this ash may be easily carried out. Special tests, such as specific gravity, may be made. Quantitative accuracy sufficient for purposes of speck characterization may be obtained with 10-40 specks, corresponding to a sample size of 0.2 to 0.5 milligram.

The presence of specks in pulp and paper is frequently of sufficient importance to justify detailed examination in order to determine their character and to locate their source. For this purpose, microscopic examination, supplemented by simple chemical tests on the microscope slide, has been widely used and has proved of great value.

If the specks under examination are not of relatively simple composition, the microscopic tests may not yield all the information desired. Otherwise reliable qualitative tests may be uncertain when applied to highly heterogeneous mixtures, and some constituents may escape detection. Such mixtures, which are frequently encountered in the investigation of pulp and paper specks, require preliminary separation of certain groups of constituents before satisfactory tests for individual components can be properly carried out.

Chemical separations and determinations on pulp and paper specks may be accomplished by the application of micro-analytical methods. Micro-analysis deals with analysis of samples appreciably smaller than those required for the ordinary methods of analysis. In general, the same reactions are used in both cases. The successful analysis of minute samples depends upon the application of manipulative techniques which have been developed for this purpose.

The size of sample necessary for quantitative micro-analysis is predicated upon the sensitivity of balances available for weighing. Ordinary micro-balances have a sensitivity of 0.001 milligram, so that a sample of 2-5 milligrams is adequate for most analyses. Thus there is possible a reduction of 100-1000 to 1 in sample size as compared with ordinary methods.

Qualitative micro-analysis may be performed on samples of from 1 mg. to 1 microgram (0.001 milligram = 1 microgram), depending upon the sensitivity of the reaction for the constituent sought, and the presence of other constituents in the substance under examination.

Pulp and paper specks usually range from 5 to 50 micrograms in weight. From 10 to 40 specks are required to provide a sample of 0.2 milligram. While a sample of this size is not adequate for many purposes, since results to not better than 1 per cent may be expected, results may prove satisfactory for purposes of speck identification. Naturally, samples of at least 0.5 milligram are desirable, and in most cases their preparation does not entail undue labor in separating a sufficient number of similar specks.

Among the important components of specks are materials extractable by organic solvents such as resin, pitch, etc., and the inorganic part, which is found in the ash. The scheme of analysis which has been followed in speck analysis emphasizes these constituents. The following is an outline of the analytical procedures which are carried out successively on the sample.

A. Extraction with ethyl ether to remove fats, oils, resins, etc., and quantitative determination of the ether-soluble material.

B. Extraction with acidulated alcohol (prepared according to TAPPI method T408m-36) or with an alcohol-benzene mixture (1:2) to remove soaps and other materials soluble in these solvents, and quantitative determination of the soluble material.

C. Quantitative determination of ash in the extracted residue.

D. Qualitative analysis of the ash for inorganic constituents.

Since usually only one sample is available and this of minimum size, it is desirable that the scheme of analysis adopted be suitable for successive determinations without destruction of the sample. The following tests may be made either on small separate portions of the sample or on the fractions separated according to the scheme given above:

1. Specific gravity of the specks. This is frequently of value in establishing the nature of the specks.
2. Separation of the material soluble in organic solvents from A and B above into:
   a. Free organic acids (free fatty and resin acids), and organic acids present as metal salts (soaps).
   b. Saponifiable material (fats, waxes, and resin esters).
   c. Unsaponifiable material (hydrocarbon oils and waxes).
3. Examination of the extracted specks by ordinary microscopic methods to detect the presence of starch, cellulose, lignin, etc.

For extraction of the specks, a special extractor has been constructed. The assembled extractor is shown in Fig. 1. It is constructed from a No. 20 standard taper ground glass joint, the outer sleeve of the joint be-

FIG. 1.
Micro-Extraction Apparatus

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ing drawn down and sealed to an all glass condenser. The specks are contained in a 30 a G3 Jena fritted glass funnel; the solvent in a tall glass thimble. After extraction is complete, the solvent is evaporated from the thimble and the extracted material may be weighed, or the loss of weight of the specks may be determined by re-weighing the funnel.

Qualitative analysis of the ash is carried out by the centrifuge cone technique described by Benedetti-Pichler-Spikes (Micro-technique of Inorganic Qualitative Analysis. Microchemical Service, Douglaston, N. Y., 1935). This micro-technique has been thoroughly tested and is entirely suitable for the analyses required. The features of this method of analysis lie not in especially sensitive or peculiar tests, but essentially in the application of ordinary methods to extremely small samples by change in techniques. In general, the qualitative tests have a sensitivity of the order of one microgram, which is adequate to distinguish all major constituents of the ash.

The specific gravity is determined by flotation methods in the centrifuge tube. A centrifuge must be used to remove air bubbles and to accentuate specific gravity differences. The gravity of the liquid may be determined in micro-pyncnometers of 0.05-0.10 cc. capacity.

The procedures described have found application in a number of cases of speck identification which could not be adequately treated by other methods. Analyses for other constituents, which have not as yet been required, may be adapted as necessary to speck analysis. Enough has been done to establish the value of such methods when chemical separation and analysis is required.

An Analysis of the Sulphite Acid-Making Process*

By W. H. Swanson[1]

Abstract

A few basic principles in connection with acid-making are pointed out, which, when appreciated, help materially in the design and operation of systems for modern manufacturing conditions.

Recent developments in the sulphite cooking process have modified the operating conditions and also the product of the acid-making phase of the system. The trend toward the use of a stronger cooking acid, particularly with respect to its free sulphur dioxide concentration, illustrate one tendency. Then, too, the complete reuse of relief liquor, for the purpose of heat recovery, through application of the socalled "hot acid" system is another specific modification. In order to realize the full benefit from these procedures, and at the same time avoid introducing operating difficulties, a full appreciation of the fundamentals underlying the whole acid-making process is required.

As a result of experience derived from the rehabilitation of several acid-making systems to meet the changed conditions enumerated before, the writer has developed a number of generalizations which have proved helpful in the solution of the various problems which have arisen. These, together with some illustrative solutions will serve as the basis for the discussion to follow.

A most convenient and obvious subdivision of acid plant functions is that which classifies them into two phases, namely—1. the acid-making system in which sulphur as sulphur dioxide, the basic ion as limestone or hydrate and water are supplied to the cooking process in quantities proportionate to the rate at which they are lost from the process in the waste liquor, etc.; 2. the recovery phase, wherein the relief gas from the cooking process containing sulphur dioxide and latent heat in the water vapor, and the relief liquor, which also contains sulphur dioxide, both free and combined, and sensible heat, are recovered.

The Raw Acid System

Considering the acid-making system, or raw acid system as it is often termed, it has already been indicated that its primary function is to supply the chemicals used in the cooking process. As a typical example assume a hypothetical case where a process requires 250 pounds of sulphur, 320 pounds of limestone and 2000 gallons of water, as a solvent, per ton of pulp produced. It is obvious that the acid making equipment must have at least the capacity for producing acid from these raw materials.

The result would be an acid analysis of only approximately 3.00 per cent total SO_2 and 1.10 per cent combined SO_2. So a system which meets the primary requirement indicated above would not meet the needs of the cooking process, inasmuch as an acid of such an anlysis would be entirely inadequate. Therefore, one fundamental in connection with the acid system proper is that it must have a capacity for producing an acid concentration appreciably higher than that indicated by the raw material consumption in the pulping process. The extent of this excess capacity is, of course, dependent on modification in the process. The hypothetical case given before assumed little or no reuse of relief liquor in the cooking acid. Under such conditions an acid concentration of 3.25 per cent total SO_2, the combined SO_2 remaining as given, would insure the production of a cooking acid at equilibrium for the temperature and pressure at which it is produced and stored in a reasonably few cycles of digester operation. Theoretically, when the cooking acid has reached its equilibrium concentration, and the relief cycle is maintained at maximum efficiency, the system acid total SO_2 concentration will drop back to 3.00 per cent and remain there until some disturbing factor causes the digester acid to drop below its normal equilibrium concentration.

Viewing the hypothetical case again, what will be the effect on the acid plant if the relief liquor from the digesters is recovered in total and makes up part of the cooking acid? Assume that this amounts to 20 per cent of the total liquid volume and has an analysis of 1.25 per cent total SO_2 and 0.5 per cent combined SO_2. This means a reclamation of approximately 26 pounds of sulphur and 32 pounds of limestone per ton of pulp produced or a reduction in sulphur consumption from 250 to 224 pounds and limestone from 320 to 287 pounds. Now,

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however, the make-up water entering the acid plant amounts to only 1500 gallons per ton and the raw acid analysis would be approximately 3.60 total SO_2 and 1.45 per cent combined SO_2. It now becomes apparent that the acid plant, while not having to produce as much raw acid in quantity, must at the same time produce one higher in concentration in order to preserve the balance between supply and consumption of chemicals. In order to assume its second function, that of supplying the excess of sulphur over that consumed to permit of building up the free sulphur dioxide concentration of the cooking acid proper, it must have the capacity to dissolve more sulphur dioxide as such in a lesser quantity of solvent. This problem may become acute under summer operating conditions.

Several methods of solving this problem have been successfully applied in the industry, all based on one of three principles, as follows:

1. Using low temperature water for acid-making, either through refrigeration or employing deep wells as a source of supply.

2. Placing the solution equipment either in part or wholly under pressure in order to increase its solution capacity.

3. Increasing the concentration of the burner gas by use of more efficient sulphur burning equipment or by solution of the SO_2 component of the gas in water, this water being subsequently heated and stripped of its sulphur dioxide by a small quantity of inert gas, this higher concentration gas replacing the original burner gas in the absorption system.

Except for the increase in complexity of the process the third method is by far the most effective and positive. However, the writer has devised such a system which functions without the application of more heat than is available from the sulphur burning operation.

It might be pointed out here that there is a further function of the acid plant which, while useful from an economy standpoint, may prove disturbing to the smooth operation of this phase of the process. Reference is made to the recovery of the over-gas from the storage tanks in the acid plant. This gas is normally reclaimed by mixing with the burner gas ahead of the fan or gas pump or feeding it independently to the weak tower of the system. It is fluctuating in volume, varying in synchronism with the fluctuations in relief gas flow rate from the digesters. Naturally this continuously upsets the pressure conditions existing in the system, reflecting on the steadiness of the draft through the sulphur burner system. The operator, in order to protect himself against this situation, must operate the burner at a point substantially lower than its maximum as concerns the concentration of the SO_2 in the burner gas.

In order to overcome this difficulty a system has been developed and operated which employs some rather novel features. In this system the over-gas, which is substantially higher in SO_2 concentration than the burner gas, is conducted through a recovery tower countercurrent to the flow of raw acid from the system. In this tower the raw acid is substantially fortified and the tail gas leaving this tower contains about the same SO_2 concentration as the burner gas. This tail gas is then stripped of its remaining SO_2, by passing through a second recovery tower countercurrent to a small quantity of water. The water used is part of that which would normally be used for acid-making but it is first diverted through the tail gas tower. It comes out of this tower as a weak SO_2 solution, varying in concentration with the relief gas fluctuations. However, it is collected in an equalizing tank where it reaches a substantially constant average before being removed at a rate corresponding to its input rate. It is joined with the acid from the weak tower of the acid-making system, and passes on to the strong tower as a part of the raw acid.

By means of this application the air rate through the burning system remains constant for any given rate of production and maximum SO_2 concentration in the burner gas can be maintained. Also, the efficiency of recovery of the valuable SO_2 component of the over-gas has not been disturbed.

Gas Recovery

In the recovery phase of the acid-making process the first principle which must be followed, and which is well understood, involves the digester relief. In order to obtain maximum recovery of the SO_2 in excess over that which is actually consumed in the pulping reactions it is necessary, with conventional systems, to blow down the digester pressure to the steam pressure corresponding to the liquor temperature at the end of the cook. There are, it is true, systems in operation which recover the SO_2 from the blow-off gases passing out of the vent stacks but these are not common.

Concerning the solution of the sulphur dioxide of the relief gas in the raw acid to produce cooking acid, the usual procedure is to bubble the relief gas through this solution in the storage tanks or accumulator, or mix the two in an eductor, the raw acid at the same time acting as the educting medium. It is apparent that both these practices are based on the assumption that the gas consists of sulphur dioxide and water vapor only. This is not the case, however. In the cooking process a considerable quantity of CO_2 is formed through a side reaction and this passes out of the digester continuously with the other components of the relief gas. Now, in order to obtain maximum concentration of cooking acid, using a mixture of gases of this type as a fortifying agent, it is necessary to employ the countercurrent principle. A recovery tower, with the raw acid flowing through it countercurrent to the relief gas is indicated. Obviously either the bubbling method or the educator method are parallel current in nature and the resulting acid cannot reach the equilibrium concentration possible at any given condition of temperature and pressure of the system. By actual experience it has been demonstrated that the employment of countercurrent relief gas recovery towers will materially increase the concentration of free SO_2 above the bisulphite for a set temperature-pressure condition.

When the recovery system employed involves the reclamation of the heat in the relief gas and liquor, as well as the sulphur dioxide component, the free sulphur dioxide concentration of the resulting cooking acid will be determined by the pressure at which the storage vessel in which it is collected is maintained. Obviously the higher this pressure for any given temperature the higher will be the equilibrium concentration of the acid, provided the acid system phase can supply the necessary sulphur dioxide to attain this concentration, as has been indicated before. Of course, the higher back pressure of the storage system will lead to difficulties in digester relief. Here again the use of split relief systems with high and low pressure recovery points have proven effective and are commonly applied. An interesting point in this connection and one which is not widely appreciated is that a back pressure of less than about 50 per cent of the relieving pressure has hardly any effect on the rate of relief from a digester.

The Discoloration of Soap-Wrap Paper*

By W. R. Keating[1]

Abstract

Three tests show definitely that the discoloration of soap-wrap paper is due partly to the reaction of carboxylic cello-dextrin with alkali, in the soap, and with atmospheric oxygen. It is not definitely shown that no similar reaction takes place with aldehydic cello-dextrin since the severe scouring to which it is subjected during its preparation is sufficient to remove most of the reducing part. That lignin gives a yellow color is shown by the effect of the caustic test on newsprint paper. Hence it is concluded that the discoloration of white paper by soap is due to the reaction of carboxylic cello-dextrin with alkali and atmospheric oxygen or by the reaction of lignin with free alkali in the soap, or both. It is also probable that cellulose degradation products of less molecular weight than cellulose, particularly those containing aldehyde groups, react with alkali to cause a portion of the discoloration.

Bleached sulphite, newsprint, and glassine papers give the following results when subjected to the Turnbull's blue test: Bleached sulphite is tinted a pale blue, slightly darker than that produced in normal cellulose. Newsprint and glassine are dyed deep blue. A definite conclusion can not be reached from these results, but the deep blue color produced in glassine indicates that unless removed by scouring the products of hydrolytic action on cellulose react similarly to the products of cellulose oxidation, and substantiates the belief that the discoloration of white paper is caused in part by the presence of aldehydic cello-dextrin.

Introduction

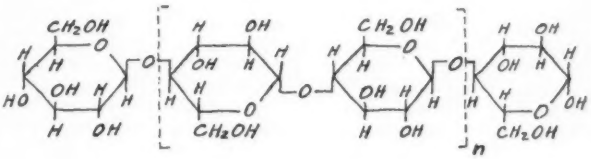
A search of the literature produced no direct reference to this problem other than a report in the *Paper Trade J.* (98, No. 9:36, March 1, 1934) by T. L. Crossley, Chairman of the Soap-Wrap Committee of the Technical Association of the Pulp and Paper Industry, giving three tentative tests for soap-wrap paper to be tried on various grades of paper by the members of the committee. The first part of this investigation was confined to an examination of these tests to determine their value and to establish standard procedures.

In the meantime the continued search of the literature for causes of discoloration of soap-wrap paper involved a study of the chemistry of cellulose and paper. The results of this investigation are given below.

Cellulose Chemistry

The modern conception of the constitution and conformation of the cellulose molecule is based on a definite experimental foundation substantiated by X-ray data and by thorough physico-chemical investigation.

Acid hydrolysis of cellulose produces, ultimately, β-glucose. Hence the basal unit of the cellulose macromolecule is β-glucose. Treatment of cellulose with acetic anhydride and sulphuric acid produces octa-acetyl cellobiose, which is easily converted to cellobiose by hydrolysis. When fully methylated cellulose is hydrolysed a product consisting chiefly of trimethyl glucose with some tetramethyl glucose is obtained. The latter apparently must have come from the commencing group of an open chain compound such as that given by the formula of Haworth. The number of hexose units in the macro-molecular chain, determined from the ratio of tetramethyl glucose to trimethyl glucose is from 100 to 200. This formula is given below:



CELLULOSE.

Copper numbers of the order of 0.1[17] obtained for the purest and least degraded celluloses, such as carefully prepared cotton cellulose indicate that the cellulose molecule is a closed chain formed by the elimination of the elements of water from the end glucose units of a compound such as the above. This would give a molecule with the empirical formula $(C_6H_{10}O_5)n$ and is believed by many investigators to be the true structure of the cellulose macromolecule.

Cellulose—Hydrate, Hydrocellulose, and Oxycellulose

The term cellulose hydrate is generally understood to designate any alteration product of cellulose having the same low copper number as the material from which it was produced. This includes mercerized cotton, the products of wet beating of wood pulp and so on. It resembles cellulose chemically but takes up more moisture and has, generally, higher absorbing power than cellulose. Hydrated cellulose is more easily hydrolysed than cellulose.

The action of water at high temperatures tends to hydrolyse cellulose breaking it down into carbohydrates of less molecular weight. Hence super-calendering at high temperature of paper made from well-beaten stocks and moistened by steam produces a semitransparent paper in which most of the fibrous structure is lost. The paper is practically grease proof and is resistant to moisture.

Hydrocellulose, at present, refers to material obtained by degradation of cellulose with acids, both by treatment with organic acids or by more drastic treatment with mineral acids. A marked reducing action is typical of hydrocelluloses. The reducing part can be removed by boiling with water, leaving a residue which shows the same characteristics as hydrate cellulose, but greater chemical activity. It shows the same x-ray interference bands as normal-cellulose and has been shown by polarimetric methods not to differ chemically from normal cellulose. Hydrocellulose is considered to be a colloidal aggregate consisting of unchanged cellulose, partly degraded cellulose, and glucose and other decomposition products of low molecular weight. Glucose and the decomposition products of lower molecular weight formed in cooking of sulphite pulp will be washed from the stock before reaching the paper machine. It is probable, however, that the partly degraded cellulose and any cellulose hydrate formed in the beater or the jordan refiner will be further hydrolysed in the drier part of the machine to carbohydrates of lower molecular weight such as gums and sugars.

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Thesis submitted in partial fulfilment of the requirements for the degree of Bachelor of Applied Science. University of Toronto, Toronto, Ont..

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It has been shown by H. A. Thomas (*J. Soc. Chem. Ind* 52: 79 1933), that hydrocellulose is transformed to oxycellulose by very mild oxidation, hence some oxycellulose is bound to be formed in the hydrochlorite bleaching process.

Mild oxidation of cellulose with hypochlorites in the presence of carbonates, by acid or alkaline permanganate solutions, by nitric acid and so forth, causes the formation of aldehyde and carboxyl groups on some of the units in the cellulose structure. Like hydrocelluloses, oxycelluloses show high reducing power. Most oxycelluloses possess a marked affinity for basic dyes and for metals from solutions of their salts, but a poor affinity for direct cotton dyestuffs. Some oxycelluloses do not exhibit these peculiar dyeing properties. There is indisputable evidence in the literature that the term "oxycellulose" does not apply to a chemical compound but to mixtures of cellulose degradation products, which vary according to the treatment to which the material has been subjected.

A. J. Hall (*Cotton Cellulose*, p. 151) describes the examination of an oxycellulose equivalent to $(C_6H_{10}O_5)0$. It had no affinity for acid dyes, but an increased affinity for basic dyes such as methylene blue. Its reducing and aldehydic properties were marked. When immersed in cold 5 N caustic soda it at once gave a deep yellow color; the same color was developed when it was boiled with 0.01 N caustic soda. Sodium carbonate solutions developed the color less readily.

The residue remaining after treatment of oxidized cellulose with alkali no longer reduces Fehlings solution and does not turn yellow with alkalies. This residue resembles cellulose hydrate quite closely.

Collected data from studies on (1) copper number and iodine number, (2) viscosities, and (3) diffusion, show a definite increase in oxycellulose with time in alkaline solutions containing oxidizing agents, (D. Kruger and H. Grunsky, *Chem. Abst.* 7000, 1934). Tests show that cotton in dilute NaOH solution (10 g.p.l.), under a pressure of 2.5 pound-atmospheres undergoes considerable damage by the oxygen of the air.

It is probable that in the presence of NaOH the aldehyde groups of both hydrocellulose and oxycellulose undergo simultaneous oxidation and reduction as does benzaldehyde.

$$2\ C_6H_5.CHO + NaOH = C_6H_5.CH_2.OH + C_6H_5.COONa$$

H. A. Thomas offers a more definite nomenclature than the terms "oxycellulose" and "hydrocellulose" for the products obtained by oxidation of cotton and by treatment of cotton with acids respectively.

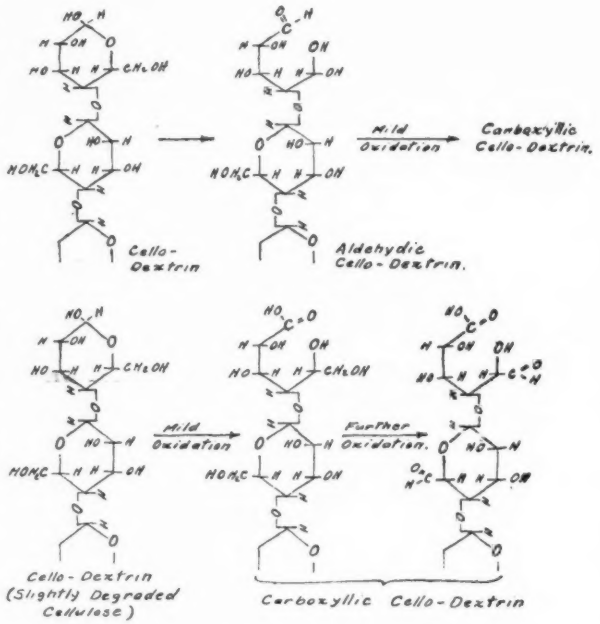
"The term, aldehydic cotton-dextrin, is suggested for hydrocelluloses which exhibit reducing properties but no affinity for metals from the solutions of their salts, or for basic dyestuffs."

"The term, carboxylic cotton-dextrin, is suggested for oxycelluloses which exhibit reducing properties, a marked affinity for metals from the solutions of their salts, and for basic dyestuffs, and a poor affinity for direct cotton dyestuffs."

Substances representing intermediate stages in the formation of aldehydic cotton-dextrin and carboxylic cotton-dextrin can be referred to as cotton-dextrins.

The author suggests the terms aldehydic cello-dextrin, carboxylic cello-dextrin, and cello-dextrin, respectively. These terms will be used in the succeeding part of this theses.

H. A. Thomas considers that in the initial stages the formation of both aldehydic cello-dextrin and carboxylic cello-dextrin scission of the macromolecular loop or long chain, and then fission of the cellulose molecule into short straight chains of various lengths, which are progressively shorter as the action becomes more drastic, occurs. It can be seen from the foregoing why in the initial stages of formation of both aldehydic and carboxylic cello-dextrin the products obtained are similar in properties, and that a mixture of degradation products must be formed. The next step in the formation of both substances is an attack on the end groups of these short chains. In the formation of aldehydic cello-dextrin these end groups are opened out to give the active reducing aldehydic form, whilst in the formation of carboxylic cello-dextrin some or all of the exposed aldehyde groups are oxidized to carboxyl groups. It is also probable that the $= CH_2OH$ group at position six in the glucose molecule is oxidized to an aldehyde group, and that further fission of the short chains occurs during the oxidation to expose more aldehyde groups. The reactions are represented as follows:



H. A. Thomas tried several distinguishing tests based on the presence of carboxyl groups in carboxylic cotton dextrin. He found the "Turnbull's blue" test was most successful. Using aldehydic cotton dextrin and carboxylic cotton dextrin carefully prepared from cotton piece with carefully scoured cotton piece as a blank, he found that bleached cotton (normal cellulose) was tinted faintly blue, the aldehydic cotton dextrin still more faintly blue, and the carboxylic cotton dextrin was colored a deep blue.

He found that carboxylic cotton-dextrin was produced by mild oxidation of aldehydic cotton-dextrin, and showed that slightly more carboxyllic cotton-dextrin was formed from aldehydic cotton-dextrin than from normal cellulose by the same oxidizing treatment.

Aldehydic cello-dextrin and carboxyllic cello-dextrin formed from filter paper, by the method used by H. A. Thomas for cotton, gave the same results with the Turnbull's blue test. Samples of each were treated by the TAPPI tests for soap-wrap paper in an attempt to discover the cause of discoloration of paper by soap.

Experimental

The Soap-Wrap Committee of the TAPPI suggested

three tentative tests for the examination of soap-wrap paper.

(1) Caustic Test:—

Place drops of ½, 1, and 2 per cent solutions of caustic soda on the paper. The procedure suggested by the committee is that 5 drops be placed, and after 30 seconds remove the excess by blotting paper. Dry the sample in air and note the depth of shade. Modifications of this test include dipping the sample in solution and drying in air, with or without absorbing the excess.

(2) Colorimetric Test:—

Boil 3 grams of sample in two successive lots of 50 cc. distilled water for five minutes each. Combine the two extracts and make up to 100 cc. Place 20 cc. of this decoction in a 5 x ¾ inch test tube, and to it add 5 cc. of normal caustic soda solution. Compare the color produced with standard comparates of equal volume, containing measured amounts of a solution of potassium bichromate containing 0.5 grams per liter, to which has been added 5 cc. of 0.1 per cent solution of congo red.

(3) Soap Test:—

Place samples of paper between freshly cut portions of a standard laundry soap and note any discoloration. Keep the samples under a pressure of two pounds per square inch, at room temperature, for 16 hours.

It will be seen from the above that methods (1) and (3) will call for an expression of opinion by the operator, on general appearance, unless color standards be developed or a form of tintometer applied.

Test (2) is an attempt to obtain a numerical value. Work done by some members of the committee indicates that different operators agree fairly well, but that details require standardizing. The color developed by the caustic soda is not of the same character in all cases, though its intensity is usually comparable to that produced with the standard color solution.

For colored papers it appears that a form of (3) could be used.

Examination of the Caustic Test (1).

Reagents:

From a standardized solution of normal sodium hydroxide (4 per cent), 200 cc. of each of the following solutions were made up.

Solution	Parts N. NaOH	Parts Distilled Water
½ per cent NaOH	1	7
1 per cent NaOH	1	3
2 per cent NaOH	1	1
3 per cent NaOH	3	1
4 per cent NaOH	1	0

Procedure of Test:

A rectangle about 6 by 8 inches was cut from the sheet of paper to be tested and treated with water and with each of the five solutions as follows:

(1) With a glass stirring rod, five drops of the liquid were placed in a straight line across the paper.

(2) Thirty seconds after the first drop was applied the drops were blotted one by one, in the order they were applied, with a filter paper.

(3) Observations were made at intervals while the paper was drying, and again 24 hours later.

Observations:

Test No. 1—Bleached sulphite paper.

Water penetrated the surface in about 20 seconds. After 30 minutes there was no discoloration on the surface or when held up to the light.

The ½ per cent NaOH solution penetrated the paper more quickly than water. After 15 minutes the paper showed a yellowish stain when held up to the light. The surface appeared white but was noticeably attacked. The 1, 2, 3 and 4 per cent NaOH solutions affected the paper in the same manner when applied. After 15 minutes all showed a yellowish stain when held up to the light; the surface was noticeably attacked in every case and was beginning to turn yellow where attacked by the 3 and 4 per cent solutions.

After 24 hours the paper showed no further change where the water and the ½ per cent NaOH solutions had been applied. The yellow tints, however, had deepened noticeably where the other four solutions were applied, being a very pale yellow for the 1 per cent solution and increasing in depth of color for the 2, 3 and 4 per cent solutions. It is important to note that the paper is dried for some minutes before the yellow stain begins to appear, and that the stains continue to grow darker for some time.

Test No. 2—Newsprint paper.

The caustic solutions penetrated the paper more quickly than water and all gave a bright yellow color immediately on application. After 24 hours the colors had become slightly darker and the color was progressively deeper in shade as the strength of caustic solution applied.

Examination of the Colorimetric Test (2).

Standard Colorimetric Solution:

About 5 grams of potassium dichromate were ground in a porcelain mortar and dried in an oven at 105 degrees C. to constant weight. It was then cooled in a dessicator, placed in a weighing bottle and 0.5000 grams weighed out by difference. The dichromate was dissolved in about 500 cc. distilled water in a 1 liter volumetric flask, 5 cc of 0.1 per cent congo red solution added and the solution made up to 1000 ml.

Tentative Procedure of Test:

To develop a suitable procedure the test was carried out as follows, and examined for defects.

Three grams of paper (air dry) were weighed out, torn into small pieces and placed in a 250-cc. erlenmeyer flask. 50 cc. of distilled water were added, a small funnel placed in the neck of the flask, and the water boiled for five minutes. The aqueous extract was decanted into a 150-cc. beaker, and the paper boiled with a second lot of 50 cc. distilled water for five minutes. The cooled aqueous extracts were then mixed in a 100-cc. volumetric flask and made up to the mark with distilled water.

Twenty-five cc. of this decoction were pipetted into a 6-inch test tube and 5 cc. of 1.053 normal NaOH solution added from a pipette. The resulting solution was then filtered into another 6 by ¾-inch test tube to remove paper fibers and a small amount of precipitate.

A few drops of standard colorimetric solution were added from a burette to about 25 cc. distilled water in a 6 by ¾-inch test tube until the color was slightly lighter than that of the extract above. The test tube was then filled with water to the same level as that in the test tube containing the extract. Colorimetric solution was then added from the burette until the color in each tube was the same.

Observations:

Three grams bleached sulphite paper required 0.45 cc. colorimetric solution. The color in both the standard and the extract was almost exactly the same, showing that the standard colorimetric solution was suitable for the test. To avoid filtering the extract after the addition of 5 cc. of

NaOH solution it was decided to filter the aqueous extract from the 150 cc. beaker into the volumetric flask, and to carry out the rest of the test as before, but without filtering from one test tube to another.

Two tests, on the same bleached sulphite paper, carried out by the revised procedure, gave results of 4.7 cc. and 5.0 cc. colorimetric solution respectively. During these tests it was noticed that the aqueous extract in the beaker became cloudy on cooling, indicating the formation of a precipitate which might affect the results of the test, and also that the extract must stand for about 30 minutes after the addition of 5 cc. of NaOH solution to reach its full depth of color.

The procedure of the test was revised to that shown below. Several tests made by the new procedure showed it to be entirely satisfactory and it was adopted as standard during the remainder of this investigation.

Colorimetric Test—Procedure

(1) Weigh out a 3 gram sample of the paper to be tested, tear into small pieces (about ⅜ inch square) and place in a 250-cc. erlenmeyer flask.

(2) To the sample add 50 cc. of distilled water. Place a small funnel in the neck of the flask, heat to boiling, and boil gently for 5 minutes. Filter the hot aqueous extract into a 100-cc. volumetric flask. Add 50 cc. distilled water to the partially extracted sample, boil for 5 minutes, and filter the hot extract into the volumetric flask as before. After the second extraction, rinse the erlenmeyer with a small quantity of distilled water and filter this into the volumetric flask. Wash the filter paper with enough distilled water to make the contents of the flask up to the mark at room temperature.

(3) Pipette 25 cc. of the solution from the volumetric flask into a 6 inch by ¾ inch test tube and add 5 cc. of normal NaOH from a pipette. Let this stand for 30 minutes before proceeding.

(4) To about 20 cc. of distilled water in a 6 inch by ¾ inch test tube add standard colorimetric solution drop by drop from a burette until the color is approximately the same as that of the extract in (3). Fill the test tube to the same level as the liquid in the extract tube (3) with distilled water and add more colorimetric solution, if necessary, until the color or shade is the same in both tubes.

TEST NO. 1.—BLEACHED SULPHITE PAPER

Six 3-gram samples, four from one sheet and two from another sheet of the same paper, were tested by the above procedure. The results are given below.

Sheet No.	Sample No.	Cc. Colorimetric Solution Aliquot No. 1	Aliquot No. 2
A	1	0.60	0.60
A	2	0.62	0.62
A	3	0.60	0.60
A	4	0.62	0.62
B	1	0.55	0.50
B	2	0.50	0.50

TEST NO. 2.—NEWSPRINT PAPER.

Three samples were taken from the same sheet of paper, tested by the above process, and the results compared with those obtained in Test No. 1.

Sheet No.	Sample No.	Cc. Colorimetric Solution
A	1	3.60
A	2	3.65
A	3	3.60

Comparison of the solutions with the standards required different technique in each case. To obtain a good check in the first test, where the solutions were a very pale yellow, it was necessary to stand facing a window, but not in direct sunlight, and to look down into the solutions while holding the two test tubes over a sheet of white paper sloped to pass both behind and underneath the tubes. In the second test the color of the test solution was slightly more reddish than that of the standard making it impossible to compare them in this way. Close checks were obtained by holding the test tubes up to a window when the difference in color was almost unapparent.

During test No. 2 a small amount of very fine precipitate formed in the aqueous extract after filtering into the measuring flasks. The solution was slightly opaque (apparently colloidal in character) and a pale yellow-green in color. On adding normal NaOH the solution turned yellow (with a faint orange tinge) and became clear. To check the effect of this precipitate on the color developed, a portion of the cold aqueous extract was filtered and 5 cc. of normal NaOH added to 25 cc. of the filtrate. The color was slightly lighter than that developed without filtration and retained the reddish tinge.

Results of both these tests indicated that the procedure employed is satisfactory throughout and that it will be suitable for testing soap-wrap paper when suitable standards have been determined.

The Soap Test

With the idea that discoloration of soap-wrap paper is due to the presence of free alkali in the soap, several soaps were examined in order to obtain one with no free alkali and another with high free alkali content. Two soaps were selected and assayed by the procedure given in the appendix.

Soap—A	
Per cent moisture	4.3
Per cent free alkali	0.0
Soap—B	
Per cent moisture	5.0
Per cent free alkali	11.7

PROCEDURE:

A section 1½ inches by ¾ inch was cut from the middle of a bar of soap. This was cut lengthwise to give two pieces 1½ inches by ¾ inch by ½ inch. The paper to be tested was placed between the two freshly cut 1½ inch by ¾ inch surfaces and a 2¼ pound weight placed on the top piece of soap to give approximately 2 pounds per square inch pressure on the paper. After 16 hours the paper was removed and examined for discoloration.

Two tests were made on each of three different types of paper with both soaps. The results are given below.

(a) *Bleached sulphite paper:*

Test (1)—Soap A gave no discoloration and the paper was not noticeably attacked.

Test (2)—Soap A was used again with identical results.

Test (3)—Soap B had noticeably attacked the paper when it was first removed but no color could be detected. After 24 hours the paper had become slightly yellow.

Test (4)—Soap B gave the same results as in test (3).

(b) *Newsprint paper:*

Test (1)—Soap A did not noticeably attack or discolor the paper.

Test (2)—Soap A had not affected the paper after 16 hours.

Test (3)—The paper was colored yellow on removal of soap B. The color which was about equivalent to that caused by 1 per cent NaOH solution had not appreciably deepened after 24 hours.

Test (4)—Soap B was used with the same results as in test (3).

(c) *Glassine (greaseproof) paper:*

Test (1)—Soap A had no effect on the paper.

Test (2)—After 16 hours the paper was slightly attacked by soap B but no color was apparent. A pale yellow color had developed after 24 hours exposure to the air.

The Testing of Soap-Wrap Paper

Definite results are obtained by the soap test. If the

paper is not colored by this test it is unlikely that it will be colored when used to wrap the soap it was tested with. The colorimetric test has several advantages. It is quicker than the soap test, and does not depend upon the opinion of the operator as does the caustic test. Both the chemicals and the apparatus used are inexpensive, and the bichromate solution is stable. Finally, it gives numerical results and tests by different operators that can be successfully compared.

In consideration of the above it is proposed that the following procedure be adopted for testing soap-wrap paper:

(1) That the soap for which wrapping paper is to be supplied be used to select a paper which is not discolored by the soap test.

(2) That the paper selected in (1) be subjected to the colorimetric test and the results noted.

(3) That the results obtained in (2) be used as a standard for the routine testing of paper shipments by the colorimetric method and that if any shipment exceed the standard the paper be subjected to the soap test as a final test of its acceptability.

The Discoloration of Soap-Wrap Paper

The examination of the three tests for soap-wrap paper disclosed the following facts: In the caustic drop test on bleached sulphite paper the yellow color did not develop until about 15 minutes after the paper was apparently dry. The soap test did not develop the full yellow color until this paper had been exposed for some time to the air. The color produced on glassine (greaseproof) paper by the soap test also deepened on exposure to air. NaOH solutions immediately developed a deep yellow color in newsprint paper. This color grew slightly darker with time. The color developed by the soap test on newsprint paper was comparatively little affected by exposure to the air. Soap A, containing no free alkali, gave no color with any of these papers.

Apparently, color was developed in lignin-free papers such as bleached sulphite and glassine, partly by reaction with NaOH and partly by the action of atmospheric oxygen in the presence of alkalies, and in papers containing lignin by direct reaction of the lignin with alkali. To determine the substance which causes discoloration in lignin-free papers, aldehydic cello-dextrin and carboxylic cello-dextrin were made from filter paper by the procedure of H. A. Thomas and subjected to the Turnbull's blue test, the caustic test, and the soap test with soap B.

Formation of Aldehydic Cello-Dextrin

10 filter papers (9 cm.) were steeped in 5 per cent sulphuric acid solution for 15 minutes at room temperature. Each piece was then blotted between clean filter papers and air dried at room temperature for 3 hours. The papers were then washed progressively by decantation in hot water (about 70 deg. C.), cold 0.1 per cent sodium carbonate solution, and cold distilled water.

Formation of Carboxylic Cello-Dextrin

Sodium hypochlorite solution was made up as follows:—108 grams of strong bleaching powder (approximately $Ca(ClO)_2.4H_2O$) and 53 grams of sodium carbonate were mixed with about 1 liter of water in a 2 liter erlenmeyer flask, stirred for 20 minutes and allowed to settle over night. The precipitated calcium carbonate was filtered out and a portion of the filtrate made up with distilled water to sp. gr. 1.02. To 750 cc. of this solution were added $750 \times 1.02/200 = 3.8$ grams of sodium carbonate or ½ per cent sodium carbonate on the total weight of the solution.

10 pieces of filter paper (9 cm.) were steeped in the 1.02 sp. gr. sodium hypochlorite solution for 15 minutes at room temperature. Each piece was then blotted between clean filter papers and air dried for 3 hours at room temperature. After drying the treated papers were washed first in distilled water, then in ½ per cent sodium hydrosulphite ($NaHSO_4$) solution at 60 deg. C., and finally in distilled water until free from hypochlorite.

Turnbull's Blue Test

REAGENTS: 1 per cent ferrous sulphate solution, 10 grams $FeSO_4$. 7 H_2O per liter.

1 per cent potassium ferricyanide solution, 10 grams K_3 Fe $(CN)_6$ per liter.

PROCEDURE: 2 pieces each of aldehydic cello-dextrin carboxylic cello-dextrin, and filter paper (normal cellulose) were immersed for 5 minutes at room temperature in a 1 per cent ferrous sulphate solution. Each piece was washed by decantation first with hot water (about 70 deg. C.), then with several changes of warm water. The six pieces were then immersed for 5 minutes in a 1 per cent solution of potassium ferricyanide at room temperature and washed by decantation with hot water. Finally the pieces were air dried at room temperature and examined for color.

OBSERVATIONS: The two pieces of filter paper (normal cellulose) were tinted a very pale blue, the aldehydic cello-dextrin a still paler blue (almost white), and the carboxylic cello-dextrin was colored deep blue. When immersed in ferrous sulphate solution the carboxylic cello-dextrin turned a pale brown, indicating that a reaction took place with the salt.

CONCLUSION: The tests show that the aldehydic cello-dextrin and carboxylic cello-dextrin were formed by the treatment given.

The Caustic Test

2 pieces each of aldehydic cello-dextrin, carboxylic cello-dextrin, and filter paper were treated with ½, 1, 2, and 3 per cent respectively of caustic soda solution.

OBSERVATIONS: There was no change apparent on either the aldehydic cello-dextrin or the filter paper. Both pieces of carboxylic cello-dextrin were colored very faintly yellow by ½ per cent NaOH solution, darker yellow by 1 per cent solution, increasingly darker by 2 per cent solution, and the darkest shade, a clear pale yellow, by the 3 per cent solution. The yellow color was not fully developed until some time after the spots, where caustic solution was applied, had dried.

The Soap Test

One piece each of aldehydic cello-dextrin, carboxylic cello-dextrin, and filter paper were treated by the procedure previously referred to as the soap test and the results noted. Soap B was used for these tests.

OBSERVATIONS: No color was developed on either the aldehydic cello-dextrin or the filter paper by the soap test. The surface of each was slightly wrinkled in the centre but did not appear to have been chemically attacked. The carboxylic cello-dextrin showed no color on the surface when first removed from the soap, but appeared pale yellow by transmitted light. It was wrinkled and slightly changed in texture at the centre. After 24 hours the surface was a pale yellow color equivalent to that caused by 1 per cent caustic soda solution.

Appendix

ASSAY OF SOAP:

The per cent moisture and the per cent free alkali were determined.

PER CENT MOISTURE:

A cross section was cut from the center of a bar of soap, weighed, and scraped in fine shavings into a large porcelain crucible. The crucible was set in a sand bath heated by a small bunsen flame and the soap continually stirred with a glass rod (weighed with the crucible) having a jagged end which greatly facilitates the stirring and breaking up of the lumps of soap formed toward the end of the operation. The operation requires about 30 minutes and the end is detected by placing a clock glass over the crucible (the flame being removed), when any moisture remaining in the soap will cause a film to condense on the inside of the glass. Care was required to prevent burning the soap but the odor thus developed is so characteristic that the manipulation was easily controlled.

PER CENT FREE ALKALI:

(1) 10 grams were cut from the center of the bar as above and exhausted with 150 cc. of absolute ethyl alcohol by refluxing in a 500-cc. round bottom flask.
(2) The hot alcohol solution was filtered and the precipitate washed with hot alcohol.
(3) The filtrate was diluted about one-third with distilled water and phenolphthalein indicator added.
(4) The precipitate was dissolved in distilled water and the volume of solution measured. A measured portion of the solution was then titrated with standard hydrochloric acid using methyl orange indicator and the total alkali calculated.
(5) Another portion of the aqueous solution was measured out and to it enough barium chloride solution to leave the solution about 0.1 normal in Ba^{++}, after all the carbonate had been precipitated, was added slowly with continuous stirring. The solution was then titrated slowly with 0.1 N sulphuric acid using phenolphthalein indicator. When the end point was reached methyl orange indicator was added and the titration continued to the final end point.

Soap A:

Weight of moist soap ..... 30.5 grams
Weight of dry soap ..... 29.2 grams
Therefore per cent moisture $30.5 - 29.2/30.5 \times 100 = 4.3$ per cent
Titration (3) = 0.0, therefore no free NaOH is present.
The soap is completely soluble in alcohol, therefore there is no free alkali present.

Soap B:

Weight of moist soap ..... 10.0 grams
Weight of dry soap ..... 9.5 grams
Therefore per cent moisture $10.0 - 9.5/10 \times 100 = 5.0$ per cent
Titration (3) = 0.0, therefore no free NaOH is present.

Volume of aqueous solution (4) = 518 cc.
250 cc. of this solution require 7.50 cc. of 0.998 N HCl to give the methyl orange end point.
Therefore 200 cc. of the solution require:
$200/250 \times 7.50/1000 \times 225/1000 \times 1/10 = 0.0285$ equivalents, or
$0.0285 \times 244.31 = 6.9$ grams $BaCl_2.2H_2O$,
to precipitate the sodium carbonate (the barium chloride to be dissolved in 25 cc. distilled water).
Titration (3) to phenolphthalein end point was 21.20 cc. 0.1998 N HCl and to methyl orange end point an additional 8.95 cc. of the same acid.
Therefore alkali as carbonate =
$518/200 \times 8.95/1000 \times 0.1998 \times 105.99 = 0.0487$ grams,
and alkali as Na_2O =
$518/200 \times 21.20/1000 \times 0.1998 \times 61.99 = 0.068$ grams
Total 0.1167 grams
Therefore per cent free alkali = $0.1167/10 \times 100 = 11.7$

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Absolutely Fast to Light*

By O. T. Chalon[1] and F. A. Soderberg[2]

There is a definite lack of information concerning the fastness to light of colored papers. This causes an undue amount of friction between the paper manufacturer and his customers. In order to relieve this tension it will be necessary to do two things, first educate the consumer and secondly to determine a satisfactory method of determining light fastness.

In this preliminary investigation we have studied the problem from three different angles:

(1) Effect of atmospheric conditions upon the fading of colored papers.
(2) Relation between fade-ometer and sunlight tests.
(3) The exposure limits within which the dyestuffs used in the paper industry range from poor to excellent fastness to light.

On the basis of the results obtained further cooperative investigation is suggested.

How many times have you been confronted with a request from a customer that your colored papers must be absolutely fast to light? Very few paper mills have escaped such a paradox and it is for this reason that we are endeavoring to increase the knowledge of what light fastness, in relation to paper, actually means. We have this thought in mind; that it may be possible to arrive at some logical conclusion whereby the manufacturer and the purchaser can meet on common ground.

Dyestuffs used in the textile industry are graded from one to eight in progressive order of light fastness. They have found, however, that the same materials when exposed in different localities under various conditions vary in resistance to fading. These discrepancies have prompted a committee to conduct a series of tests throughout the world to determine the effect of such things as humidity, altitude, temperature, time of day and month of year upon a series of representative textile samples.

Oxidation, we know, is responsible for most colors fading, which accounts for the relatively greater fastness to light of deep shades as against tints produced with the same dyestuffs. Textile materials, printing inks, and beater dyed papers form three distinct groups wherein fading occurs in an entirely different manner. This fact influenced our decision to make a thoroughly independent survey of the factors influencing the fastness to sunlight of beater dyed papers.

Preliminary Report

Within the past year, aided by fifteen collaborators in various parts of the United States. we have been able to advance our investigation to the point where there are sufficient data available to submit a preliminary report. It is our sincere hope that in so doing we may be able to interest others in an effort to determine a common denominator

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TABLE I

	Location	Temperature	Per Cent Relative Humidity	Feet Elevation	Inches Under Glass	Position
1.	Erie, Pennsylvania	93–100	35–61	670	.....	.....
2.	Hartsville, South Carolina	80–90	24–58	227	8	Horizontal
3.	Mt. Tom, Massachusetts	72–84	49–50	1260	4	Horizontal
4.	Holyoke, Massachusetts	84–93	57–62	96	4	Horizontal
5.	Newton Falls, New York	85–92	42–84	1383	8	45 degrees
6.	Canton, North Carolina	50	40–50	2750	Outside	45 degrees
7.	Lawrence, Massachusetts	80	67–100	52	½	Horizontal
8.	Richwood, West Virginia	83–84	52–53	2350	6	Horizontal
9.	Neenah, Wisconsin	82–87	52–57	754	Directly under	Horizontal
10.	Dayton, Ohio	102–108	11–25	780	1⅜	Horizontal
11.	Portland, Oregon	85	48	259	1½	Horizontal
12.	Portland, Oregon	80	53	566	1½	Horizontal
13.	Housatonic, Massachusetts	85	60	760	2	Vertical
14.	Castleton, New York	79	68	50	¾	45 degrees
15.	New York City	65–67	67–89	300	4	Horizontal

whereby we can evaluate the fastness to light of dyestuffs used in the paper industry.

In Table I are listed the fifteen different points where our test cards were exposed to sunlight, together with the temperature, relative humidity, elevation above sea level and the distance between the sample and the plate glass. Practically all the work was completed during September, 1936, and without exception, care was taken to expose the cards near noonday in bright sunlight. Where two results appear they represent the minimum and maximum readings taken during the period of the experiment.

The test cards were prepared with identical samples of the principal basic, acid and direct dyestuffs on bleached and unbleached sulphite while the tinting blue sheets were made using bleached sulphite only.

The pulps were selected carefully and while the unbleached sulphite discolored far more than the bleached, each was considered the fastest to light available. Size and alum were also chosen for their excellent resistance to fading. The various groups of cards were then exposed as follows: (a) Basic one hour, (b) Acid two hours, (c) Direct or substantive four hours, and (d) Tinting blues eight hours.

Discussion of Data Obtained

Tabulation of the results was then accomplished by numbering the tests from one to fifteen, and listing them with the least fast to light in number one position and the best of the group at number fifteen as shown in Table II. It was found that in nearly every instance there was sufficient difference between the individual tests, to leave no doubt as to the relative position of each sample in the table.

Naturally, it is quite important to have all the variables constant in any test in order to satisfactorily interpret the results thus obtained.

When you inspect Tables I and II closely you will find that not only do atmospheric changes influence the results obtained but also the dyestuffs themselves react individually. This deduction is substantiated by the irregular position of test number 12 throughout Table II. Without question the only comparisons which we can logically make are those between exposure in the same vertical columns.

We were exceedingly fortunate inasmuch as the tests made at Lawrence, Mass., and those at Castleton, N. Y., were conducted under practically identical conditions.

TABLE II

	Basic Colors										Acid Colors									
	Unbleached Stock					Bleached Stock					Unbleached Stock						Bleached Stock					
Order	Yellow	Red	Violet	Blue	Green	Yellow	Red	Violet	Blue	Green	Yellow	Orange	Red	Violet	Blue	Green	Yellow	Orange	Red	Violet	Blue	Green
1.....	10	11	2	11	11	6	12	2	2	2	6	6	11	11	11	11	14	14	8	10	14	10
2.....	11	2	11	10	10	12	2	6	6	12	14	12	10	10	6	12	10	8	14	14	10	14
3.....	6	10	12	2	2	2	6	12	12	6	11	11	6	6	10	10	8	10	7	8	8	11
4.....	14	9	10	4	6	9	7	9	4	9	10	10	12	12	12	6	4	4	10	7	11	8
5.....	9	6	6	14	14	7	9	7	7	4	3	2	14	14	2	14	11	11	4	4	4	7
6.....	2	12	7	6	9	14	14	14	9	14	12	14	2	2	14	2	7	6	6	11	7	4
7.....	3	4	9	7	4	4	3	3	8	8	9	1	9	7	7	9	6	7	11	6	6	9
8.....	4	14	14	9	12	5	4	4	14	7	8	7	1	7	8	8	2	9	9	9	9	6
9.....	7	7	4	1	1	3	10	10	1	10	4	9	7	1	9	7	1	2	1	2	1	3
10.....	15	3	3	12	8	1	11	8	11	11	7	3	8	4	4	1	3	1	2	1	3	1
11.....	5	8	8	3	3	8	8	1	3	3	2	8	4	8	1	4	12	3	3	5	2	5
12.....	1	5	5	8	7	11	1	5	10	1	5	4	3	5	3	3	5	12	12	3	5	2
13.....	8	1	1	5	5	10	5	11	5	5	1	5	5	3	5	5	9	5	5	12	12	12
14.....	12	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
15.....	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13

TABLE II

	Direct Colors														Tinting Blues						
	Unbleached Stock							Bleached Stock							Bleached Stock						
Order	Yellow	Orange	Red	Violet	Blue	Green	Black	Yellow	Orange	Red	Violet	Blue	Green	Black	1	2	3	4	5	6	7
1.....	10	10	10	10	2	8	8	9	10	10	10	9	8	8	10	2	2	2	2	2	6
2.....	14	14	7	2	8	10	2	10	9	8	8	8	10	10	2	10	8	8	8	10	8
3.....	9	9	14	14	10	2	10	2	8	9	4	10	2	2	8	8	12	10	12	8	2
4.....	6	6	2	9	9	14	7	8	2	4	14	4	4	4	14	12	10	12	10	12	10
5.....	7	7	6	7	14	7	14	7	4	2	7	2	9	7	11	14	9	9	7	9	7
6.....	4	4	9	6	7	9	9	4	7	7	2	7	11	9	12	11	4	4	9	7	9
7.....	2	2	4	4	6	6	4	14	14	5	11	11	14	11	4	4	11	14	4	14	12
8.....	1	1	15	8	4	4	6	5	5	14	9	14	7	14	1	7	14	1	14	4	14
9.....	15	15	1	12	12	1	12	1	12	1	5	1	1	1	9	1	1	11	1	11	4
10.....	5	8	8	1	1	12	5	12	1	12	1	5	6	6	5	9	7	7	11	1	11
11.....	8	12	12	15	5	5	11	6	6	11	12	6	5	3	7	5	3	5	5	3	1
12.....	12	5	5	11	15	11	1	15	15	6	6	12	12	5	3	3	5	3	15	5	5
13.....	11	11	11	5	11	15	3	11	11	15	15	15	3	12	15	15	13	15	3	15	3
14.....	3	3	3	3	3	3	15	3	3	3	3	3	15	15	13	6	15	13	13	13	15
15.....	13	13	13	13	13	13	13	13	13	13	13	13	13	13	6	13	6	6	6	6	13

Upon examining the listing of various colors as they actually faded, you will observe how often the numbers 7 and 14 appear in close proximity to one another. By counting the number of tests between these two figures in each column it is found that the average difference in location on the chart is 1.07. This fact is very important as it permits us to conclude that the fastness to light of colored paper is influenced to a great extent by the climatic conditions.

In the textile and wall paper fields the fade-ometer is used rather generally to test for fastness to light. Very often these materials must undergo a 24-hour test without evidence of perceptible fading. However, it is quite impractical to expect a dyed sheet of paper to withstand such a rigorous test when the uncolored fiber itself will discolor in a much shorter time.

Conversion Table Prepared

Many paper mills are not equipped with fade-ometers and it, therefore, becomes expedient to find some medium whereby sunlight tests may be interpolated in relation to fade-ometer exposures. Sunlight varies in intensity during the various months of the year, with the summer sun causing far greater fading than that encountered during the winter. A number of representative dyestuffs from the various groups which are used in the paper industry were exposed in the fade-ometer for periods of 15, 60 and 120 minutes. Other portions of the same dyeings were then bared to bright sunlight in each of the twelve months of the year, until every shade had faded to the same degree as its counterpart in the fade-ometer. In Table III you will find a compilation of these results with an average ratio of sunlight against fade-ometer exposure during each month of the year. From these results you can readily understand how unfair it is to judge a paper exposed to January sunlight in direct comparison with one which has been placed in the July sun.

This table will be of assistance to technical men in the paper industry as it can be used to transpose the figures obtained from sunlight exposures into terms of fade-ometer hours, or vice versa.

The month of June is fairly representative of the period of the year wherein the sun's intensity is near its peak. It was considered desirable, therefore, to make comparisons of fade-ometer and sunlight reactions on all dyestuffs during that time. In Table IV we have classified, so far as it is possible at present to do so, the time of exposure in both mediums to determine the difference between poor and excellent fastness. This table is offered as the possible basis for a light fastness scale in the paper industry.

There are several important factors other than the dyestuffs used which must be considered if you are to have satisfactory resistance to the sun's rays. It is essential, of course, that the pulp which is selected does not discolor readily. Some types of sulphite which have been overbleached have a tendency to change shade rapidly in sunlight. Groundwood, kraft, and the poorer grades of unbleached sulphite offer practically no defense to fading.

Fillers and starches too may either improve or retard the fastness of colored papers and should be chosen with considerable care and thought.

TABLE IV

Fade-ometer:	
Poor	Faded in ½ hour.
Fair	Not faded in ½ hour, but faded in 1½ hours.
Good	Not faded in 1½ hours, but faded in 3 hours.
Very good	Not faded in 3 hours, but faded in 6 hours.
Excellent	Not faded in 6 hours.
Sunlight:	
Poor	Faded in 1 hour.
Fair	Not faded in 1 hour, but faded in 3 hours.
Good	Not faded in 3 hours, but faded in 6 hours.
Very good	Not faded in 6 hours, but faded in 12 hours.
Excellent	Not faded in 12 hours.

Varieties of Fading

The fading of paper can be different in character and the effects are usually divided into three groups, namely,

A. Loss of depth or intensity without any considerable change of shade.
B. Darkening of shade and accompanying loss of brilliancy.
C. A decided change of hue, for instance from a purplish blue into a greenish blue.

If some precaution is exercised in the selection of dyestuffs for any given shade it is quite possible to find those which counteract the adverse reaction of one another, thereby minimizing the apparent fading. As an example, assume that a green is produced using a yellow and a blue. The yellow has a greenish cast while the blue is red in tone. In this instance if the yellow fades toward the red, and the blue becomes greener you have the phenomenon of two components counteracting one another advantageously.

Many of you have probably endeavored to reason with a customer who has allowed a few sheets of wrapping paper tinted with the most fugitive basic colors to stand on his desk on a bright summer day. Naturally, a large portion of the paper sold today never reaches sunlight until it has served the purpose for which it was intended.

Suggested Paper Test

Colored textiles and paints must withstand snow and rain as well as the sun's rays, while paper is very seldom exposed to sunlight except through plate glass windows. With this in mind we have conducted a series of experiments and have concluded that paper may be tested satisfactorily as follows:

Paste samples on a heavy piece of paper board with a flap which will cover one-half of the surface. Put the flap in place by means of a clamp, making sure that the unexposed surface is completely protected. Place the sample underneath, one inch from, and horizontal to, a sheet of plate glass of 1/16 inch thickness, at an angle of 45 degrees to the sun. A frame should be built to hold the glass so that air will circulate around the sample freely. The paper should face toward the south in an absolutely unobstructed area, preferably on a rooftop.

Conclusion

In this report we believe that there is assembled enough convincing evidence to prove unquestionably that so far as the paper industry is concerned, the term "absolutely fast to light" is a misnomer. That the consumer should not insist upon resistance to fading in excess of the true requirements of his finished product. And finally, that some definite step should be taken whereby a standard method of testing can be evolved.

TABLE III

		Jan. Hrs.	Feb. Hrs.	Mar. Hrs.	Apr. Hrs.	May Hrs.	June Hrs.	July Hrs.	Aug. Hrs.	Sept. Hrs.	Oct. Hrs.	Nov. Hrs.	Dec. Hrs.
Poor	Fade-ometer	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼
	Sunlight	4	2.7	2	1.7	1	0.7	0.5	0.5	1.5	3.2	3.2	3
Fair	Fade-ometer	1	1	1	1	1	1	1	1	1	1	1	1
	Sunlight	8.5	8.5	8	4	2	1.8	1.7	1.7	3	4	7	10
Good	Fade-ometer	2	2	2	2	2	2	2	2	2	2	2	2
	Sunlight	17	18	11	5	4	2	2	2	4	7	13	25
	Average ratio	1:11	1:10	1:7	1:4.5	1:2.6	1:2.2	1:1.6	1:1.6	1:4	1:7	1:9	1:11

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports, of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING AUGUST 28, 1937

SUMMARY

Cigarette paper ..... 3 cs.
Wall paper .....3 bls., 92 bxs., 4 cs.
Paper hangings ..... .5 bls.
Wall board ..... 40 crates
Newsprint ..... 8,474 rolls
Wrapping paper ..... 423 bls., 1,319 rolls, 93 cs.
Filter paper ..... 41 cs.
Filter pulp ..... 70 cs
Tracing cloth ..... 27 cs.
Baryta coated paper ..... 121 crates, 33 cs.
Metal coated paper ..... 20 cs.
Photo paper ..... 7 cs.
Decalcomanias ..... 8 cs.
Decalcomania paper ..... 11 drums (duplex)
Transfer pictures ..... 3 cs.
Writing paper ..... 6 cs.
Colored paper ..... 5 cs.
Transparent paper ..... 3 cs.
Paper tubes ..... 470 pkgs.
Miscellaneous paper ....185 bls., 625 rolls, 13 bbls., 44 cs.

CIGARETTE PAPER

De Mauduit Paper Corp., *Ile de France,* Havre, 3 cs.

WALL PAPER

———, *American Farmer,* London, 3 bls.
American Express Co., *Pr. Cleveland,* Kobe, 1 cs.
S. K. Lonegren, *Drottningholm,* Gothenburg, 51 bxs.
S. K. Lonegren, *Drottningholm,* Gothenburg, 41 bxs. (Sample books).
———, *Europa,* Bremen, 3 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., *American Farmer,* London, 5 bls.

WALL BOARD

H. G. Craig Co., *Kermic,* Donnacona, 40 crates.

NEWSPRINT

N. Y. Evening Journal, *Vasaholm,* Norrkoping, 1474 rolls.
Brooklyn Daily Eagle, *Vasaholm,* Norrkoping, 531 rolls.
Gilman Paper Co., *Vasaholm,* Norrkoping, 627 rolls.
H. G. Craig Co., *Donpaco,* Donnacona, 422 rolls.
International Paper Co., *International No. 1,* Gatineau, 309 rolls.
International Paper Sales Co., *Arizpa,* Cornerbrook, 9582 rolls.
H. G. Craig Co., *Kermic,* Donnacona, 301 rolls.
N. Y. Post, *Goviken,* Port Alfred, 2155 rolls.
International Paper Co., *G. T. D.,* Gatineau, 306 rolls.
Jay Madden Corp., *Scanyork,* Kotka, 454 rolls.
Jay Madden Corp., *Hansa,* Hamburg, 397 rolls.
Perkins Goodwin & Co., *Hansa,* Hamburg, 240 rolls.
H. G. Craig Co., *A. C. D.,* Donnacona, 300 rolls.

WRAPPING PAPER

Yardley & Co., *American Farmer,* London, 3 cs.
Guaranty Trust Co., *Drottningholm,* Gothenburg, 423 bls., 1319 rolls.
Steiner Paper Corp., *Hansa,* Hamburg, 55 cs.
E. Dietzgen & Co., *Hansa,* Hamburg, 35 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., *American Farmer,* London, 16 cs.
C. Schleicher & Schull Co., Inc., *Hansa,* Hamburg, 25 cs.

FILTER PULP

Gerhard & Hey, *Maasdam,* Rotterdam, 70 cs.

TRACING CLOTH

C. Bruning Co., Inc., *Europa,* Bremen, 27 cs.

BARYTA COATED PAPER

L. A. Consmiller, *Europa,* Bremen, 10 cs.
Globe Shipping Co., *Hansa,* Hamburg, 121 crates.
Atlantic F'd'g Co., *Hansa,* Hamburg, 23 cs.

METAL COATED PAPER

K. Pauli & Co., *Hansa,* Hamburg, 20 cs.

PHOTO PAPER

J. J. Gavin, *Queen Mary,* Southampton, 7 cs.

DECALCOMANIAS

Sellers Transportation Co., *Europa,* Bremen, 8 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Laconia,* Liverpool, 11 drums (duplex).

TRANSFER PICTURES

Rohner Gehrig & Co., *Europa,* Bremen, 3 cs.

WRITING PAPER

Japan Paper Co., *American Farmer,* London, 6 cs.

COLORED PAPER

———, *Europa,* Bremen, 2 cs.
International F'd'g Co., *Hansa,* Hamburg, 3 cs.

TRANSPARENT PAPER

M. J. Corbett & Co., *Maasdam,* Rotterdam, 3 cs.

PAPER TUBES

———, *Hansa,* Hamburg, 470 pkgs.

MISCELLANEOUS PAPER

A. Johnson & Co., *Drottningholm,* Gothenburg, 170 bls.
E. H. Sergeant & Co., *Drottningholm,* Gothenburg, 4 cs.
Moller Products Corp., *Arimasan Maru,* Yokohama, 29 cs.
H. Reeve Angel & Co., Inc., *Arimasan Maru,* Yokohama, 7 cs.
Whitefield Paper Works, Inc., *Arimasan Maru,* Yokohama, 4 cs.
The Borregaard Co., Inc., *Gripsholm,* Gothenburg, 177 rolls.
Guaranty Trust Co., *Gripsholm,* Gothenburg, 448 rolls, 15 bls.
Jay Madden Corp., *Scanyork,* Helsingfors, 13 bbls.

RAGS, BAGGINGS, ETC.

E. J. Keller Co., Inc., *Excalibur,* ———, 65 bls. paper stock.
Hughes Fawcett, Inc., *California,* Glasgow, 25 bls. flax waste.
M. Snedeker Corp., *American Importer,* Belfast, 87 bls. paper stock.
Keene, Inc., *Pipestone County,* Havre, 59 bls. rags.
R. Blank, *Pipestone County,* Havre, 107 bls. rags.
Castle & Overton, Inc., *Pipestone County,* Havre, 60 bls. rags.
Castle & Overton, Inc., *Pipestone County,* Dunkirk, 49 bls. new cuttings.
———, *Laconia,* Liverpool, 56 bls. rags.
Linter Supply Co., *Wales Maru,* Shanghai, 100 bls. cotton waste.
S. Shapiro & Sons, *Wales Maru,* Kobe, 40 bls. thread waste.
Guarnty Trust Co., *Wales Maru,* Kobe, 100 bls. cotton waste.
G. A. Henshaw & Son, *Konigstein,* Antwerp, 168 bls. flax waste.
Philadelphia National Bank, *Konigstein,* Antwerp, 67 bls. rags.
———, *Haukefjell,* Antwerp, 76 bls. bagging.
Guaranty Trust Co., *Haukefjell,* Antwerp, 83 bls. bagging.
Darmstadt Scott & Courtney, *Vigilant,* Gdynia, 78 bls. rags.
Michigan Felt Works, *Kimikawa Maru,* Shanghai, 200 bls. picker waste.
Manufacturers Trust Co., *Scanyork,* Copenhagen, 9 bls. rags.
E. J. Keller Co., Inc., *City of Guildford,* ———, 50 bls. paper stock.

HIDE CUTTINGS

American Express Co., *American Importer,* Liverpool, 582 bags.

OLD ROPE

Loumar Textile By Products, Inc., *Wales Maru,* Kobe, 80 bls.
Loumar Textile By Products, Inc., *Kimikawa Maru,* Kobe, 80 bls.

CHINA CLAY

English China Clay Sales Corp., *Laconia,* Liverpool, 25 casks.

WOOD PULP

Stora Kopparberg Corp., *Vasaholm,* Skutskar, 2000 bls. dry pulp.
Pagel Horton & Co., Inc., *Vasaholm,* Skutskar, 1665 bls. sulphate, 375 bls. sulphite.
———, *Vasaholm,* Iggesund, 1500 bls. sulphate.
Bulkley Dunton Pulp Co., Inc., *Vasaholm,* ———, 2500 bls. sulphite.
Perkins Goodwin & Co., *Vasaholm,* Sundsvall, 450 bls. sulphite, 378 bls. sulphate.
Gottesman & Co., Inc., *Vasaholm,* Sundsvall, 3600 bls. sulphite.
———, *Hein Hoyer,* Stugsund, 1175 bls. sulphite, 235 tons.
Bulkley Dunton Pulp Co., Inc., *Hein Hoyer,* ———, 1200 bls. sulphate, 200 tons; 3000 bls. chemical pulp, 600 tons; 500 bls. sulphite, 100 tons.
Johaneson Wales & Sparre, Inc., *Hein Hoyer,* Sundsvall, 2000 bls. sulphite, 400 tons; 120 bls. knotter pulp, 20 tons; 150 bls. kraft sulphate, 25 tons.
Mead Sales Co., Inc., *Hein Hoyer,* Sundsvall, 310 bls. sulphite, 62 tons.
———, *Hein Hoyer,* Hernosand, 6000 bls. sulphite, 963 tons.
———, *Hein Hoyer,* Hernosand, 3960 bls. sulphate, 660 tons.
———, *Hein Hoyer,* Hernosand, 5043 bls. sulphate, 840 tons.
Pulp Specialties, Inc., *Drottningholm,* Gothenburg, 169 bls. sulphate.
Perkins Goodwin & Co., *Drottningholm,* Gothenburg, 139 bls. sulphite.
M. Sone, *Livenza,* Trieste, 106 bls. wood pulp.
Guaranty Trust Co., *Livenza,* Trieste, 1248 bls. sulphite.
Bankers Trust Co., *Livenza,* Sebenik, 4800 bls. sulphite.
Absorbo Beer Pad Co., *Saturnia,* Trieste, 240 bls. wood pulp.
Price & Pierce, Ltd., *Consul Corfitzon,* Wallvik, 2322 bls. unbleached sulphite.
Price & Pierce, Ltd., *Consul Corfitzon,* Hernosand, 3000 bls. unbleached sulphite, 500 tons.
E. M. Sergeant Pulp & Chemical Co., *Consul Corfitzon,* Hernosand, 1050 bls. sulphite, 175 tons.
———, *Consul Corfitzon,* Hernosand, 300 bls. sulphite, 50 tons.
Bank of N. Y. Trust Co., *Consul Corfitzon,* Hernosand, 1500 bls. sulphite, 250 tons.
Bulkley Dunton Pulp Co., Inc., *Consul Corfitzon,* ———, 4200 bls. wood pulp, 866 tons.
N. Y. Trust Co., *Vigilant,* Gdynia, 640 bls. wood pulp, 98 tons.
Guaranty Trust Co., *Hansa,* Hamburg, 83 bls. wood pulp, 16 tons.

WOOD PULP WASTE RESIDUE

———, *American Farmer,* London, 10 drums.

WOOD PULP BOARDS

Salwen Paper Co., *Drottningholm,* Gothenburg, 22 bls.
Fibre Case & Novelty Co., Inc., *Drottningholm,* Gothenburg, 33 bls.
H. Fuchs & Son, *Drottningholm,* Gothenburg, 54 crates.
H. Fuchs & Son, *Gripsholm,* Gothenburg, 34 crates.
Jay Madden Corp., *Scanyork,* Kotka, 8 bls.
Jay Madden Corp., *Hansa,* Hamburg, 187 crates.

ALBANY IMPORTS

WEEK ENDING AUGUST 28, 1937

International Paper Co., *Orion,* Chatham, N. B., 1600 cords pulpwood.
Halifax Power & Pulp Co., *Siredal,* Sheet Harbor, 10058 bls. ground wood pulp, 2248 tons.

PORTLAND IMPORTS

WEEK ENDING AUGUST 28, 1937

Price & Pierce, Ltd., *Consul Corfitzon,* ———, 2652 bls. unbleached sulphite; 3180 bls. unbleached sulphate.

BOSTON IMPORTS

WEEK ENDING AUGUST 28, 1937

———, *Pipestone County,* Havre, 200 bls. rags.
———, *Pipestone County,* Dunkirk, 46 bls. rags.
Royal Manfg. Co., *Wales Maru,* Shanghai, 50 bls. cotton waste.
D. E. Cummings Co., *Wales Maru,* Kobe, 75 bls. thread waste.
Horton & Hubbard Manfg. Co., *Maasdam,* Rotterdam, 26 bls. wood pulp boards.
———, *Maasdam,* Rotterdam, 59 rolls straw boards.
Royal Manfg. Co., *Kimikawa Maru,* Kobe, 50 bls. thread waste.
Royal Manfg. Co., *Kimikawa Maru,* Shanghai, 50 bls. cotton waste.

PHILADELPHIA IMPORTS

WEEK ENDING AUGUST 28, 1937

Philadelphia Inquirer, *Vasaholm,* Norrkoping, 500 rolls newsprint.
Stora Kopparberg Corp., *Vasaholm,* Skutskar, 265 bls. dry pulp.
Perkins Goodwin & Co., *Vasaholm,* Sundsvall, 600 bls. sulphite; 1500 bls. sulphate.
Gottesman & Co., Inc., *Vasaholm,* Sundsvall, 600 bls. sulphite.
Gottesman & Co., Inc., *Vasaholm,* Gefle, 5000 bls. sulphite.
Gottesman & Co., Inc., *Vasaholm,* Iggesund, 950 bls. sulphite.
Bulkley Dunton Pulp Co., Inc., *Vasaholm,* ———, 500 bls. sulphite.
E. J. Keller Co., Inc., *Black Hawk,* ———, 124 bls. rags.
Castle & Overton, Inc., *Black Hawk,* Rotterdam, 134 bls. rags.
———, *Hein Hoyer,* Stugsund, 250 bls. sulphite, 50 tons.
———, *Hein Hoyer,* Stugsund, 925 bls. sulphate, 185 tons.
Mead Sales Co., Inc., *Hein Hoyer,* Sundsvall, 1800 bls. sulphite, 300 tons.
Johaneson Wales & Sparre, Inc., *Hein Hoyer,* Sundsvall, 925 bls. sulphite, 180 tons.
Perkins Goodwin & Co., *Hein Hoyer,* Sundsvall, 300 bls. kraft sulphate, 50 tons.
Atterbury Bros., Inc., *Hein Hoyer,* Sundsvall, 300 bls. dry pulp, 50 tons.
Bulkley Dunton Pulp Co., Inc., *Hein Hoyer,* ———, 250 bls. sulphite, 50 tons.
———, *Hein Hoyer,* Hermosand, 972 bls. sulphite, 153 tons.
American Cotton Products Co., *Kimikawa Maru,* Shanghai, 200 bls. cotton waste.
M. Sone, *Idarwald,* Hamburg, 106 bls. wood pulp.
Lagerloef Trading Co., *Scanyork,* Helsingfors, 5150 bls. sulphite, 875 tons.
J. W. Hampton Jr. & Co., *Scanyork,* Kotka, 822 rolls newsprint.
Jay Madden Corp., *Scanyork,* Kotka, 303 rolls newsprint; 277 bls. wood pulp boards, 39 tons.

CAMDEN IMPORTS

WEEK ENDING AUGUST 28, 1937

Bulkley Dunton Pulp Co., Inc., *Vasaholm,* ———, 3600 bls. sulphite.
Castle & Overton, Inc., *Maasdam,* Rotterdam, 161 bls. rags.
Castle & Overton, Inc., *Haukefjell,* Antwerp, 245 bls. rags.

WILMINGTON IMPORTS

WEEK ENDING AUGUST 28, 1937

Castle & Overton, Inc., *Scanyork,* Kotka, 5749 bls. sulphite, 1149 tons.
Jay Madden Corp., *Scanyork,* Kotka, 135 rolls newsprint.
Lagerloef Trading Co., *Scanyork,* Kotka, 1058 bls. wood pulp boards, 121 tons.
Price & Pierce, Ltd., *Roxen,* ———, 7188 bls. unbleached sulphite; 150 bls. unbleached mechanical pulp.

BALTIMORE IMPORTS

WEEK ENDING AUGUST 28, 1937

———, *Hein Hoyer,* Stugsund, 1500 bls. sulphite, 300 tons.
———, *Hein Hoyer,* Stugsund, 2580 bls. sulphate, 516 tons.
Mead Sales Co., Inc., *Hein Hoyer,* Sundsvall, 10350 bls. sulphite, 1725 tons; 625 bls. chemical pulp, 125 tons.
Johaneson Wales & Sparre, Inc., *Hein Hoyer,* Sundsvall, 1800 bls. sulphite, 325 tons; 4200 bls. kraft sulphate, 700 tons.
Bulkley Dunton Pulp Co., Inc., *Hein Hoyer,* ———, 125 bls. chemical pulp, 25 tons; 1350 bls. sulphite, 270 tons.
M. Sone, *Livenza,* Trieste, 2750 bls. wood pulp.
Congoleum Nairn Co., *Excello,* Marseilles, 377 bls. rags.
———, *Livenza,* Trieste, 3046 bls. wood pulp.
Congoleum Nairn Co., *Haukefjell,* Antwerp, 233 bls. rags.
S. Shapiro & Sons, *Kimikawa Maru,* Kobe, 115 bls. rags.

Price & Pierce, Ltd., *Roxen*, ——, 6150 bls. unbleached sulphite; 150 bls. unbleached sulphate.
Gottesman & Co., Inc., *City of Fairbury*, Sweden, 500 bls. sulphite; 2125 bls. sulphate.

NEW ORLEANS IMPORTS

WEEK ENDING AUGUST 28, 1937

Mente Co., *Wales Maru*, Kobe, 400 bls. bagging.
Johaneson Wales & Sparre, Inc., *Vigilant*, Gdynia, 1050 bls. wood pulp, 50 tons.

HOUSTON IMPORTS

WEEK ENDING AUGUST 28, 1937

Southern Bagging Co., *Wales Maru*, Kobe, 2000 bls. bagging.
Darmstadt Scott & Courtney, *Vigilant*, Gdynia, 72 bls. rags.

GALVESTON IMPORTS

WEEK ENDING AUGUST 28, 1937

Burka Bagging Co., *Wales Maru*, Kobe, 290 bls. bagging.

TAPPI Notes

An unprecedentedly large attendance is expected at the fall convention of the Technical Association of the Pulp and Paper Industry, Savannah, Ga., Oct. 18-21, 1937.

Two large hotels will house those in attendance, the De Soto and the Savannah. These hotels are located near each other and free taxi service will be provided between the two hotels.

Arthur Dreshfield and C. E. Mueller of the Paper Makers Chemical Division of the Hercules Powder Company have been transferred from Kalamazoo, Mich. to Wilmington, Del.

Harry F. Lewis, Dean of the Institute of Paper Chemistry recently underwent an operation for appendicitis.

D. S. Davis, now with the Chemical Engineering Department of Wayne University, Detroit, Mich., expects to resume work on pulp and paper problems while continuing with Dale S. Davis Associates, consulting mathematicians, in an advisory capacity.

Pipe for Industrial Uses

"6 to 36 Inch Pipe for Industrial Uses" is the title of an attractive 44-page spiral bound booklet just issued by The American Rolling Mill Company, of Middletown, Ohio. Advantages of ARMCO Spiral Welded Pipe are listed in the forepart of the booklet. Technical data includes thermal expansion data and methods of determining wall thickness. Standard dimensions of fittings for flanged pipe, joints and various types of couplings are indicated.

The last section describes the exterior, interior and hot dip coatings applied to the pipe at the mill. Flow charts and complete information for field installations furnish valuable data for men in the field.

Barriers to Industrial Waste

A new edition of the 68-page insulation booklet, "Barriers To Industrial Waste," has been published by Johns-Manville.

This booklet contains a complete and improved table of recommendations to serve as a guide to the proper selection of J-M Insulations for a wide variety of uses in practically all industries. Amply illustrated, it describes in detail more than 50 different insulations for all types of heated or refrigerated equipment.

Copies are available free upon request to Johns-Manville, 22 East 40th street, New York City.

New Fairbanks, Morse Pump

A two-stage built-together pump (pump and motor built together) has been developed by Fairbanks, Morse & Co. to operate against heads up to 500 feet —higher than could be handled by a single-stage unit. In many applications it offers a less expensive alternative for multi-stage and split-case pumps, and its compactness and sturdiness qualify it for portable and semi-portable as well as stationary service.

The new F-M pump is well adapted for all classes of general pumping service with liquids low in viscosity and free from excessive foreign matter. Because of its compact design, the pump is especially advantageous where space is limited. No special foundation is required; the pump is complete in itself and can be mounted in any convenient horizontal, vertical or angular position. Installation is simple.

This new built-together pump, entirely designed and built in one factory, consists essentially of a two-stage centrifugal pump, with enclosed bronze impellers, mounted directly on the shaft of an F-M splash-proof motor. There are no flexible coupling or alignment problems with which to contend. Two rugged ball bearings, an electric motor construction feature pioneered by Fairbanks-Morse many years ago and later adopted by other manufacturers, take all of the radial and unbalanced thrust loads. Impellers for the two stages are placed back to back, compensating thrust. Improved hydraulic design is attained by placing the first stage unit next to the motor and the second stage on the outside, simplifying the cross-over passage and placing the stuffing box under suction instead of pressure. A mounting leg under the pump end gives the unit added stability.

Further information on this new pump will be found in Bulletin 5592, obtainable from Fairbanks, Morse & Co., 900 South Wabash avenue, Chicago, Illinois.

Lange's Handbook of Chemistry

The Handbook Publishers, Sandusky, Ohio, has just published the second edition of the Handbook of Chemistry, edited by N. A. Lange, of Western Reserve University. It has 1802 pages, is 5⅜ x 7¾ inches in size, fabricoid binding. The price is $6.

This excellent handbook prepared largely for industrial chemists, has in its first edition, found rather exclusive use in paper mills. Its 29 page index facilitates its use and its large, clear type reduces eyestrain.

In addition to the many tables that one would expect to find in such a handbook the following subjects are of particular interest to operating men in pulp and paper mills: Properties of minerals; Constants for fats, waxes and oils; Physical and chemical properties of resins; dyestuffs intermediates; Water Analysis; Chemicals required for treatment of algae; Killing dosage of copper sulphate for fish; Drinking water standards; Formulas for water softeners; Composition of various woods; Composition and heating value of representative coals; Combustion constants of gases; Properties of alloys; Materials of construction; Pipes, valves and fittings; Acid-base indicators; Gum and resin solvents; Hydrometers; Humidity and dew-point tables; etc. There are also 250 pages of mathematical data and tables.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 E. 42nd street, New York, N. Y.

Work of the Import Committee

The importer of 20-inch side runs who had instituted a protest in United States Customs Court against the imposition of duty on this paper has formally abandoned a test of the issue in court, according to a report issued by Warren B. Bullock, manager of the Import Committee of the American Paper Industry.

The Assistant Attorney General in Charge of Customs has appealed to the United States Court of Customs and Patent Appeals from the decision of the United States Customs Court that 15-inch side runs are duty free as standard newsprint.

Under instructions from Washington Customs officials in Puerto Rico have collected duty on importations of about 1,000 tons of side runs in 20-inch widths and narrower rolls, entered by a Puerto Rican newspaper as standard newsprint, but sold by the newspaper as wrapping paper.

The importers have taken steps to appeal to the United States Supreme Court from the decision of the United States Court of Customs and Patent Appeals which held that 38 pound paper imported for the Christian Science Monitor's weekly rotogravure supplement is dutiable printing paper and not duty free as standard newsprint. The Department of Justice has filed a brief asking that the petition for a writ of certiorari be denied.

Paper of newsprint quality imported at Buffalo in sheets 20 x 52 and 44 x 60 inches in size, probably for use by bakers as pan paper, is before the Customs officials on the importer's claim that it is duty free as standard newsprint. Available records indicate that no such size is used by newspapers.

Reid Co. Acquires Timber Rights

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 25, 1937—An option agreement was recently signed by the receiver of the Reid Newfoundland Company, Limited, and important British interests, for the acquisition of timber rights of the company in Newfoundland, according to a report from Alfred Nutting of the office of the Commercial Attache at London. These are chiefly in the Gander River basin on the east coast of Newfoundland and comprise about 4,000 square miles of virgin forest reported to contain approximately 8,000,000 cords of standing timber.

Should the British interests take up this option, they will erect sulphite pulp mills to supply an important part of the companies' requirements. A tide water site in Newfoundland will be selected for the pulp and pulp wood to be shipped throughout the year direct to the various mills of the companies in the United Kingdom. Representatives and engineers of the companies are in Newfoundland to arrange for a survey of the forests and to discuss facilities necessary before the option can be exercised or development begun. The combined annual newsprint output of the two companies exceeds 500,000 tons.

L. H. Gregson Goes With Great Northern

L. H. Gregson, formerly with the Great Northern Paper Company, has entered the employ of the Pejepscot Paper Company, with mills at Brunswick and Pejepscot Mills, Maine, in the capacity of superintendent of the Pejepscott groundwood pulp mill.

International Nickel Expands

A. J. Wadhams, vice-president in charge of Development and Research, the International Nickel Company, Inc., has announced the addition of Wayne Z. Friend to the Development and Research Staff.

Mr. Friend will devote most of his time to technical service on corrosion resisting materials, particularly monel, nickel and inconel. His experience has been principally in the petroleum and natural gas industries and covers the production, refining and marketing of petroleum products, natural gas and liquified petroleum gases.

After graduation from West Virginia University in 1926 with a Master's Degree in Chemical Engineering, Mr. Friend engaged in the production and marketing of natural gasoline with Gasoline Recovery Corporation, Charleston, W. Va. During the past seven years he has been associated with Phillips Petroleum Company and, as Chief Technologist of Philgas Department of that company at Detroit, Mich., has been recently engaged in the industrial application of liquified petroleum gases to heat treating requirements of the automotive and other metal industries. He has been active on Committees of the American Gas Association, National Bottled Gas Association and American Society for Testing Materials.

To Erect Cellophane Plant at Clinton

A plant for the production of "Cellophane" will be erected at Clinton, Iowa, by E. I. duPont de Nemours & Co. The company has acquired a large tract of land lying between the Chicago and Northwestern Railroad and the west channel of the Mississippi River, just outside the city limits.

Upon completion the plant is expected to employ approximately 500 persons, 75 to 80 per cent of whom will be recruited locally. A crew of engineers will arrive in Clinton in the near future to make detailed surveys on which to base the layout and design of the plant. The plant proper, the first "Cellophane" production unit west of the Mississippi, will comprise about 20 acres under roof. It is expected that a large power unit will also be installed.

The investment required is not sufficiently definite at this time to make an accurate estimate, the company said, but indicated that it would be a substantial one, amounting to several million dollars.

The new Iowa location will extend existing "Cellophane" production centers to four. Two plants are situated at Nashville, Tenn., two at Richmond, Va., and two at Buffalo, N. Y.

Paper Novelty Mfg. Co. Leases Space

The Paper Novelty Manufacturing Company, Inc., of 225 East 36th street, Manhattan, New York City, has leased from the Continental Baking Company the buildings at 505 Carroll street, running through to President street, near Fourth avenue, Brooklyn. The structures contain about 100,000 square feet of floor space and will give the tenant double the space it has occupied for about twenty-five years in Manhattan. The concern makes paper novelties, greeting cards and party favors. The Cross & Brown Company was the broker in the transaction.

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New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, September 1, 1937.

The volume of business in this market is fair for the season, which is normally quiet. In the fine paper trade, a moderate business is reported in bonds, ledgers, book papers and in box coverings. Manufacturers of fine papers are now catching up on their schedules and the mills are looking forward to an improved demand in September.

The newsprint market is active and business is moving in seasonable volume. The demand for wrapping paper is reflected in fairly good-sized sales. Summer specialties are moderately active. Box board is quiet, with a firm undertone in this market. The trade is generally optimistic for an improvement in the immediate future.

Chemical Pulp

The demand for chemical pulp continues good. Contract prices on domestic bleached sulphite pulp have been advanced $5 per ton for the last quarter of 1937. The market on imported chemical pulp continues firm with no change in prices, except in the so-called spot market, which is slightly weaker.

Mechanical Pulp

The mechanical pulp market is unchanged for the week. Business is reported as being closed at prevailing quotations for immediate and future deliveries. Prices are firm under a steady demand.

Old Rope and Bagging

The demand for old rope continues quiet, with no noteworthy change reported in domestic or foreign business in manila. The volume of business in old rope and bagging is characterized in the trade as slow. Prices are generally firm, with slightly less activity.

Rags

The demand in the domestic rag market was about on the level of the preceding week, when prices reacted to a slightly higher level. Current prices in this market are unchanged, with the exception of the domestic supply of No. 2 roofing stock, on which prices were increased slightly.

Waste Paper

A good demand for waste paper continued to support a firm market in this item. The prices of mixed paper are unchanged in domestic quotations. A fair demand for export, held prices steady. Nothing of note is reported in folded news stock.

Twine

The twine market is moderately active, with sisal, jute and hemp moving in fair-sized quantities. Prices show a tendency to drop to a slightly lower level. Polished and unpolished cotton twines are reported to be in somewhat better demand.

Union Bag Proceedings Dismissed

[FROM OUR REGULAR CORRESPONDENT]

HUDSON FALLS, N. Y., August 30, 1937—Certiorari proceedings launched by the Union Bag and Paper Company against officials of this city for a reduction in the assessment value of its property were dismissed this week following a review of the case by Supreme Court Justice E. C. Rogers. It is the opinion of Judge Rogers that the property of the company is assessed at a fair figure and in his dismissal of the proceedings he confirmed the assessed valuation determined by the village assessors. While the total assessed valuation of the company in this place is $726,185 covering 30 separate parcels, only 21 parcels assessed at $709,004 were involved in the proceedings. The company contended that these parcels were over-assessed to the extent of $410,099 or more. Taking of testimony in the proceedings required the greater part of the week of June 14 and Joseph O. Mitchell, of the National Bureau of Property Administration of Chicago, testifying for the paper company, said the true value of the properties in 1936 was $275,000. John Sheehy, an appraiser, testifying for the village, placed a value of $1,535,139 on the property. The paper company was represented by Lindsay Goetz, Wilton D. Cole and Leroy E. Middleworth.

Swedish Exports of Newsprint

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 25, 1937—Sweden exported 6,405 metric tons of newspaper print to the United States during May bringing the total shipped to this country this year to 35,617 metric tons, according to a report to the Department of Commerce by Charles E. Dickerson, Jr., American Commercial Attache, Stockholm.

The United States was the largest consumer while Argentina was second, that country having purchased 8,876 metric tons from January to May of this year, according to the report.

Vanderbilt Installs Clay Abrasion Tester

R. T. Vanderbilt Company, 230 Park Avenue, New York City, have recently installed in their laboratory a Valley Iron Works Company clay tester. This instrument is used for the detection of excessive abrasiveness tending to shorten the life of the wires on the paper machine, and will permit the R. T. Vanderbilt Company to add one more important control to assure high and uniform quality together with a vital safeguard to their many customers.

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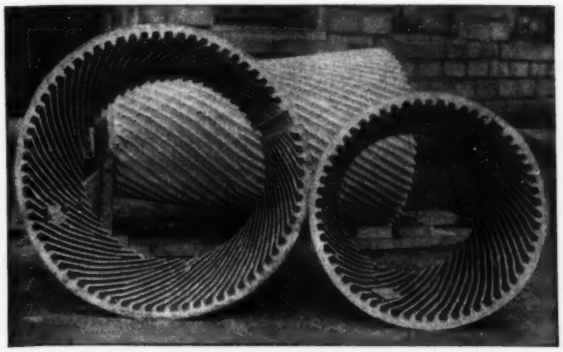

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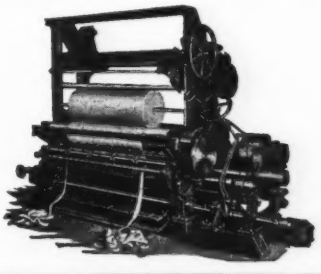

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, September 1, 1937.

BLANC FIXE—The blanc fixe market is quiet. Prices remain unchanged at former levels. Pulp prices are quoted at from $42.50 to $45 per ton. The powder is quoted at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—The demand for bleaching powder continues at a seasonable level, with contract orders normal. Prices conform to former quotations. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The condition of the casein market is normal, with demand good and prices firm. Domestic standard ground casein is quoted at from 13 to 14 cents per pound; domestic finely ground casein at from 13½ to 14½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA—The demand for caustic soda is normal and the market firm. Prices for solid caustic soda are quoted at from $2.10 to $2.30. Flake and ground is quoted at from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—The china clay market is active, with contract shipments moving in good volume. Imported china clay is quoted at from $14.50 to $25 per ton, ship side. Domestic paper making clay is quoted at from $6.50 to $12 per ton, at works.

CHLORINE—The condition of the chlorine market is normal for the season, with the contract movement satisfactory. Prices are on par with former quotations. Chlorine is quoted at $2.15 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is firm. Paper making rosin is quoted at $8.07½, and wood rosin at $8.00 per 280 pounds, gross weight, in barrels at Savannah. Seventy per cent rosin size is quoted at $3.67 per 100 pounds, in tank cars, f.o.b., shipping point.

SALT CAKE—The demand for salt cake is good and the market firm. Prices are quoted at from $12 to $13; chrome salt cake at from $10 to $11, f.o.b., shipping point, while imported salt cake is quoted at $12, Gulf or Atlantic Seaboard, on dock.

SODA ASH—The soda ash market is active with a strong demand from paper mills. Prices remain at formerly quoted levels. Quotations on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—The condition of the starch market is inactive. Quotations remain at the newly established levels. Papermaking starch is quoted at $3.45 per 100 pounds, in bags, and at $3.70 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA—The sulphate of alumina market is good for the season, with contract shipments moving freely. Prices are steady. Commercial grades are quoted at from $1.25 to $1.60, while iron free is quoted at from $2 to $2.25 per 100 pounds, in barrels, at works.

SULPHUR—The demand for sulphur remains firm. Annual contracts are quoted at $18 per long ton, f.o.b., cars at mines. On spot and nearby car loads, the price is $21 per ton. All quotations are in car lots.

TALC—The talc market is active. Prices conform with former market levels. Domestic talc is quoted at from $15 to $18 per ton, at Eastern mines, while imported talc is quoted at from $23 to $30 per ton, on dock.

Market Quotations

Paper

Tissues—Per Ream—			
White No. 1	1.10	@	—
White No. 1 M. G.	1.07½	@	—
White No. 1½	.77½	@	—
White No. 2	.75	@	—
Anti-Tarnish M. G.	.77½	@	—
Colored	.90	@	—
Kraft	.77½	@	—
Manila	.75	@	—
Unbleached Toilet	2.60	@	3.30
Bleached Toilet	3.94	@	5.26
Paper Towels—			
Unbleached	2.10	@	3.35
Bleached	3.30	@	3.70
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75
(Delivered New York)			
News, per ton—			
Roll, contract	42.50	@	—
Sheets	47.50	@	—
Kraft—			
No. 1 Northern	5.25	@	5.75
Standard	5.00	@	—
Southern	5.00	@	—
Glazed	4.50	@	—
Striped	4.75	@	—
Boards, per ton—			
News	47.50	@	—
Chip	45.00	@	—
Sgl. Mla. Ll. Chip	55.00	@	—
Jute Lined Chip	55.00	@	—
Kraft Liners	65.00	@	—
White Pat. Coated	67.50	@	—
Binders Boards	75.00	@	80.00

The following are representative of distributors' resale prices:—

Rag Content Bonds and Ledgers—
White, Assorted Items,
Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1	$41.40	@	$42.55	@ $50.00
100% Rag	32.80	@ 38.50	33.95	@ 39.75
85% Rag			32.20	@ 37.75
75% Rag	24.75	@ 29.00	25.90	@ 30.50
65% Rag	21.65	@ 26.25	22.80	@ 27.75
50% Rag	18.70	@ 22.75	19.90	@ 24.25
25% Rag	15.80	@ 19.25	16.95	@ 20.75

Regular Colors @ $1.50 cwt. extra.
Heavy Colors @ $3.00 cwt. extra

Sulphite Bonds and Ledgers—
White, Assorted Items,
Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$9.35 @ $11.50	$10.55 @ $12.75
No. 2	8.50 @ 10.25	9.65 @ 11.75
No. 4	7.60 @ 9.25	8.80 @ 10.75

Regular Colors @ $1.50 cwt. extra.
Heavy Colors @ $3.00 cwt. extra.

Free Sheet Book Papers—
White, Cased Paper,
Delivered in Zone 1:

No. 1 Glossy Coated	$12.45	@	$14.25
No. 2 Glossy Coated	10.80	@	12.25
No. 3 Glossy Coated	9.65	@	11.00
No. 4 Glossy Coated	9.05	@	10.50
No. 1 Antique (watermarked)	9.05	@	10.50
No. 2 Offset	8.35	@	9.50
A Grade E. F.	8.20	@	9.50
A Grade S. & S. C.	8.45	@	9.75
B Grade E. F.	7.60	@	8.75
B Grade S. & S. C.	7.85	@	9.00
C Grade E. F.	7.30	@	8.50
C Grade S. & S. C.	7.55	@	8.75
D Grade E. F.	7.00	@	8.25
D Grade S. & S. C.	7.25	@	8.50

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	35.00	@	36.00
Dry	40.00	@	42.00
(Delivered)			
No. 1 Domestic and Canadian	36.00	@	37.50

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	3.25	@	4.65
Prime Qualities—Easy-Bleaching Sulphite	3.50	@	4.00
Strong Unbleached Sulphite	3.25	@	3.65
(On Dock, Atlantic Ports)			
Kraft Bleached	4.00	@	4.75
Kraft Light & Strong	3.00	@	3.75
Kraft No. 1	2.90	@	3.65
Kraft No. 2	2.50	@	2.75
(F.o.b. Pulp Mill)			
Kraft Domestic	2.75	@	3.25
(Delivered)			
Soda Bleached	3.15	@	—

Add 60 cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	8.75	@	9.00
Silesias, No. 1	6.75	@	7.00
New Unbleached	9.25	@	9.50
Blue Overall	7.25	@	7.50
Fancy	3.75	@	4.25
Washables	2.75	@	3.25
Mixed Khaki Cuttings	4.25	@	4.50
O. D. Khaki Cuttings	4.75	@	5.00

Old Rags

White, No. 1—			
Repacked	3.75	@	4.25
Miscellaneous	3.00	@	3.25
White, No. 2—			
Repacked	2.60	@	2.85
Miscellaneous	2.00	@	2.25
Thirds and Blues—			
Repacked	2.00	@	2.25
Miscellaneous	1.90	@	2.00
Roofing Rags—			
No. 1	Nominal		
No. 2	1.15	@	1.20
No. 3 (bagging)	.90	@	1.00
No. 4	.90	@	1.00
No. 5A	.75	@	.85

Foreign Rags

New Rags

New Dark Cuttings	Nominal
New Mixed Cuttings	Nominal
New Light Silesias	Nominal
Light Flannelettes	Nominal
New White Cuttings	Nominal
New Light Oxfords	Nominal
New Light Prints	Nominal

Old Rags

No. 1 White Linens	Nominal
No. 2 White Linens	Nominal
No. 3 White Linens	Nominal

"Buffalo" CENTRIFUGAL PAPER STOCK PUMPS

NON CLOGGING IMPELLERS
NON OVERLOADING H. P.
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LOWER OPERATING COSTS

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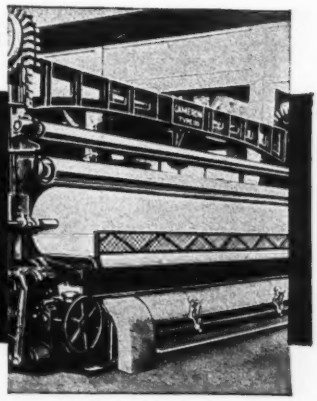

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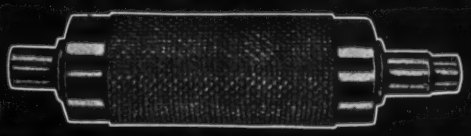

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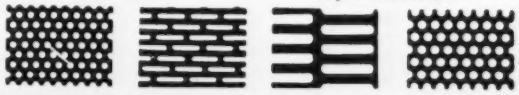

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5652 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N.Y.

No. 4 White Linens	Nominal
No. 1 White Cotton	Nominal
No. 2 White Cotton	Nominal
No. 3 White Cotton	Nominal
No. 4 White Cotton	Nominal
Extra Light Prints	Nominal
Ord. Light Prints	Nominal
Med. Light Prints	Nominal
Dutch Blue Cottons	Nominal
French Blue Linens	Nominal
German Blue Linens	Nominal
German Blue Cottons	Nominal
Checks and Blues	Nominal
Linsey Garments	Nominal
Dark Cottons	Nominal
Old Shopperies	Nominal
New Shopperies	Nominal
French Blues	Nominal

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.35	@	2.50
Domestic	2.25	@	2.35
Wool Tares, light	1.75	@	1.85
Wool Tares, heavy	2.35	@	2.45
Bright Bagging	1.70	@	1.75
Manila Rope—			
Foreign	4.75	@	5.00
Domestic	5.00	@	5.25
Jute Strings	2.75	@	3.00
Sisal Strings	2.60	@	2.75
Mixed Strings	Nominal		

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	3.10	@	3.25
Ordinary Hard White No. 1	2.60	@	2.70
Hard White No. 2	2.40	@	2.50
Soft White No. 1	2.30	@	2.40
Flat Stock—			
Stitchless	1.50	@	1.55
Overissue Mag	1.50	@	1.55
Solid Flat Book	1.20	@	1.25
Crumbled No. 1	.85	@	.95
Ledger Stock	1.55	@	1.60
New B. B. Chips	.45	@	.50
Manila—			
New Env. Cut	2.15	@	2.25
New Cuttings	1.65	@	1.75
Old Kraft Machine—			
Compressed bales	1.55	@	1.65
News—			
No. 1 White News	1.45	@	1.55
Strictly Overissue	.65	@	.75
Strictly Folded	.42½	@	.47½
No. 1 Mixed Paper	.45	@	.50

Twines

(F. o. b. Mill)

(Soft Fibre)			
Coarse Polished—			
India	.16	@	.18½
Belg. White Hemp	.17	@	.20½
India Compress	.16½	@	.17
Fine Polished—			
Fine India	.22	@	.24
Unpolished—			
Box	.11¾	@	.12¼
Paper Makers	.11½	@	.13¾
Tube Rope	.12½	@	.15¼
Wall Paper	.13½	@	.14¼
Wrapping	.17	@	.21
Soft Fiber Rope	.15¼	@	—
(Hard Fibre)			
Bond	.13½	@	.14
Anchor	.12	@	.16
Manila	.21	@	.28
Domestic	4.25	@	4.50
Transmission Rope	2.00	@	2.25
Jute Rope	1.85	@	2.12½
Soft Jute Strings	2.00	@	2.50
Jute Carpet Threads	1.75	@	2.00
Gunny No. 1			
Foreign	2.35	@	2.40
Domestic	2.10	@	2.15
Bleachery Burlap	4.00	@	4.25
Scrap Burlap—			
Foreign	2.15	@	2.25
Domestic	1.75	@	1.85
Scrap Sisal	2.25	@	2.30
Scrap Sisal for Shredding	2.40	@	2.50
Wool Tares, heavy	—	@	2.25
New Burlap Cuttings	2.45	@	3.00
Aust. wool pouches	3.25	@	3.50
Heavy bailing bagging	2.50	@	2.70
Paper Mill Bagging	1.70	@	1.75
Bagging No. 2	1.00	@	1.10

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.03½	@	.03¾
New White No. 1	.08½	@	.08¾
New White No. 2	.06	@	.06½
New Light Flannelettes	—	@	.06½
Silesias No.	—	@	.06½
New Black Silesias	.04¼	@	.04½
Soft Unbleached	.09¼	@	.09½
Blue Cheviot	.07¼	@	.07½
Fancy	.03¾	@	.04
Washable	.03	@	.03¼
Cottons—According to grades—			
Blue Overalls	.07	@	.07¼
New Black, soft	.04¼	@	.04½
Khaki Cuttings	.04½	@	.04¾
O. D. Khaki	.04¾	@	.05
Corduroy	.03¼	@	.03½
New Canvas	.07¾	@	.08¼
B.V.D. Cuttings	.08¼	@	.09

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.75	@	2.00
Third and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62¼
Black Stockings	3.90	@	4.00
Roofing Stock—			
No. 1	1.40	@	1.50
No. 2	1.30	@	1.35
No. 3	1.05	@	1.15

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.65	@	1.85
Dutch Blues	3.00	@	3.15
New Checks and Blues	2.85	@	3.00
Old Fustians	3.00	@	3.25
Old Linsey Garments	2.15	@	2.50
New Silesias	6.50	@	7.00

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	—	@	.09
New White, No. 2	.04½	@	.05
Light Silesias	.05½	@	—
Silesias, No. 1	—	@	.05½
Black Silesias, soft	.03½	@	.04
New Unbleached	.08¼	@	.08¾
Washable, No. 1	.02¼	@	.02½
Blue Overall	.06½	@	.07
Cottons—According to grades—			
Washable, No. 2	—	@	.02
New Blue	.01¾	@	.02
Fancy Percales	.03	@	—
New Black Soft	.03	@	.03½
New Light Seconds	—	@	.05½
New Dark Seconds	1.50	@	1.75
Khaki Cuttings—			
No. 1 O. D.	.04	@	.04½
No. 2 Mixed	—	@	.03
Corduroy	.02¾	@	.03
New Canvas	.06½	@	.07
New Black Mixed	.02	@	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	3.50	@	4.00
Miscellaneous	2.75	@	3.25
Thirds and Blues—			
Miscellaneous	2.00	@	2.25
Repacked	2.25	@	2.50
Black Stockings (Export)	4.50	@	5.00
Roofing Stock—			
Foreign No. 1	1.75	@	2.00
Domestic No. 1	1.50	@	1.70
Domestic No. 2	1.30	@	1.40
Roofing Bagging	—	@	1.25

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.80	@	2.00
Domestic	2.00	@	2.25
Manila Rope	4.25	@	4.50
Sisal Rope	2.00	@	2.25
Mixed Rope	1.00	@	1.10
Scrap—			
No. 1	2.00	@	2.25
No. 2	1.00	@	1.25
Wool Tares, heavy	3.25	@	3.50
Mixed Strings	1.00	@	1.10
No. 1 New Light Burlap	3.00	@	3.50
New Burlap Cuttings	2.00	@	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	—	@	2.60
No. 2 Hard White	2.20	@	2.25
No. 1 Soft White	2.25	@	2.30
No. 2 Soft White	1.75	@	—
No. 1 Mixed	—	@	.85
Solid Ledger Stock	—	@	1.75
Ledger Stock, white	1.75	@	—
Ledger Stock, colored	1.50	@	—
No. 1 Books, heavy	1.10	@	1.15
Manila Cuttings	1.80	@	1.90
Print Manila	.70	@	.75
Container Manila	.65	@	—
Kraft Paper	1.75	@	—
No. 1 Mixed Paper	.40	@	.45
Straw Board Chip	.50	@	—
Binders Board Chip	.50	@	—
Corrugated Board	.65	@	.70
Old Newspapers	.55	@	.60
No. 1 Old Manila	.95	@	1.00
White Blank News	1.30	@	1.40
No. 1 Kraft	1.75	@	—
Mixed Papers	.42½	@	.47½
Print Manila	.65	@	.70
Container Manilas	.27¼	@	—
Old Newspapers	.52½	@	.57½
Overissue News	.60	@	.65
Box Board Chips	.35	@	.40
Corrugated Boxes	.62½	@	.67½
Kraft corrugated boxes	1.20	@	1.22½
Screening Wrappers	.60	@	.65

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.20	@	2.35
No. 1 Soft White	1.85	@	2.15
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.50	@	1.75
Overissue Ledger Stock	1.30	@	1.50
Mixed Ldgers	.85	@	.90
No. 1 Books, heavy	1.00	@	1.10
No. 1 Books, light	.65	@	.75
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.60	@	1.70
Manila Env. Cuttings, extra quality	2.20	@	2.30

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	4.25	@	4.40

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings	3.30	@	3.40
No. 1 Hard White	2.60	@	2.70
No. 1 Soft White	2.10	@	2.15
Ledger & Writings	1.40	@	1.50
Solid Books	1.25	@	1.30
Blanks	1.50	@	1.65
Krafts	1.00	@	1.25
New Kraft Cuts	1.80	@	2.00
Manila Env. Cuts	2.20	@	2.35
Ex. No. 1 Manila	2.20	@	2.35
Print Manila	1.70	@	1.80
Overissue News	.80	@	.90
Old Newspapers—			
No. 1 Folded News	.80	@	.90
No. 1 Mixed Paper	.80	@	.90
Roofing Stocks—			
No. 1	2.00	@	2.25
No. 2	1.85	@	2.00

TORONTO

Paper

Bonds and Ledgers

Delivered

No. 1 White	.35½	@	.36½
No. 1 Tints	.36½	@	.37½
No. 2 White	.26½	@	—
No. 2 Tints	.27½	@	—
No. 4 White	.15	@	.1550
No. 4 Tints	.16	@	.1650
No. 5 Bond—White	11.35	@	—
No. 5 Bond—Tints	12.35	@	—
No. 5 Bond—Golden Rod	13.35	@	—
No. 5 Ledger—White	.11½	@	—
No. 5 Ledger—Tints	.12	@	—
No. 6 Bond—White	10.75	@	—
No. 6 Bond—Tints	11.25	@	—
No. 6 Bond—Golden Rod	12.75	@	—
No. 7 Bond—White	9.10	@	—
No. 7 Bond—Tints	9.70	@	—
No. 7 Bond—Golden Rod	11.20	@	—
Book—			
No. 1 M. F.	7.10	@	7.35
No. 2 M. F.	6.85	@	7.20
No. 3 M. F.	5.60	@	6.20
No. 1 S. C.	7.60	@	7.85
No. 2 S. C.	7.00	@	7.35
No. 3 S. C.	6.10	@	6.35
No. 1 Coated and Litho	12.50	@	—
No. 2 Coated and Litho	11.00	@	—
No. 3 Coated and Litho	9.50	@	10.00
Coated tinted	13.00	@	13.50
Wrapping—delivered—			
Rag Brown	4.85	@	5.55
White Wrap	4.00	@	—
"B" Manila	4.90	@	6.25
No. 1 Manila	5.50	@	7.00
Fiber	5.50	@	—
Kraft, No. 2	5.50	@	—

(F. o. b. Cars, Toronto)

News, per ton—			
Rolls (contract)	38.50	@	—
Sheets	45.50	@	—

Pulp

Ground wood	32.00	@	—
Unbleached Sulphite	59.00	@	—
Book (Class 1)	71.00	@	—
Writing (Class 2)	72.00	@	—
Select (Class 3)	73.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.50	@	—
Soft White	2.15	@	—
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	1.00	@	—
Light and Crumpled Book Stock	.85	@	—
Ledgers and Writings	1.20	@	—
Manilas—			
New Manila Cut	1.50	@	—
Printed Manilas	.65	@	—
Kraft	1.00	@	1.70
News and Scrap—			
Strictly Overissue	.65	@	—
Strictly Folded	.60	@	—
No. 1 Mixed Paper	.50	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.09	@	.09¼
Fancy Shirt Cuttings	.03½	@	.03¾